TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS

INTERMEDIATE

RADIO SET AN/URC-98, AN/URC-98A AND RADIO SET AN/URC-99, AN/URC-99A

Magnavox Government and Industrial Electronics Company

Contract No. F19628-79-C-0051 and F19628-85-C-0016

This manual supersedes TO 12R2-2URC-102, dated 31 December 1982.

This publication is required for official use or for administrative or operational purposes only. Distribution is limited to U.S. Government agencies. Other requests for this document must be referred to Warner Robins ALC/MMEDT, Robins AFB, GA. 31098-5609.

Published under authority of the Secretary of the Air Force

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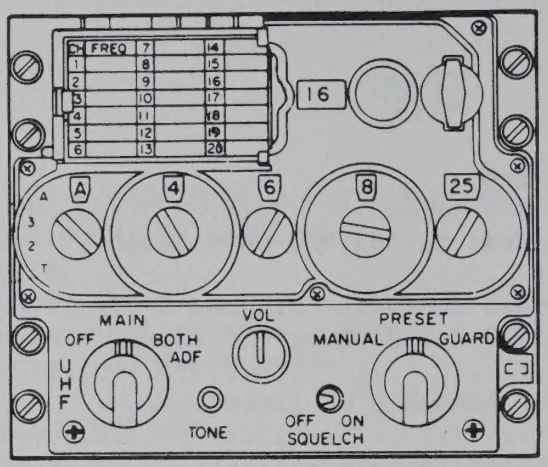
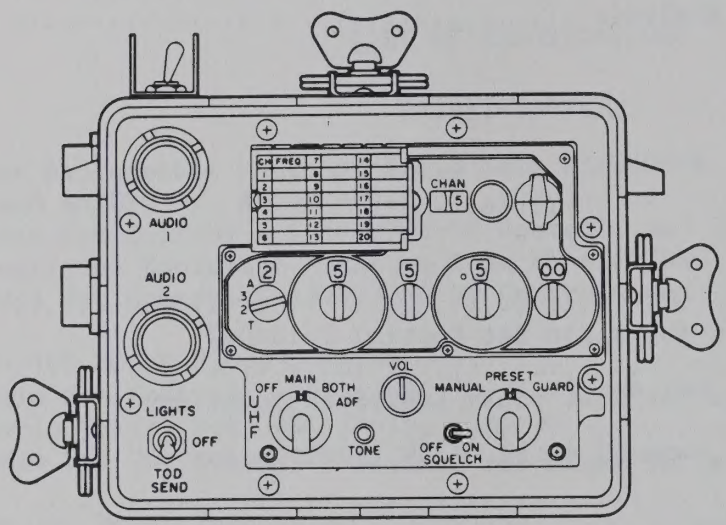
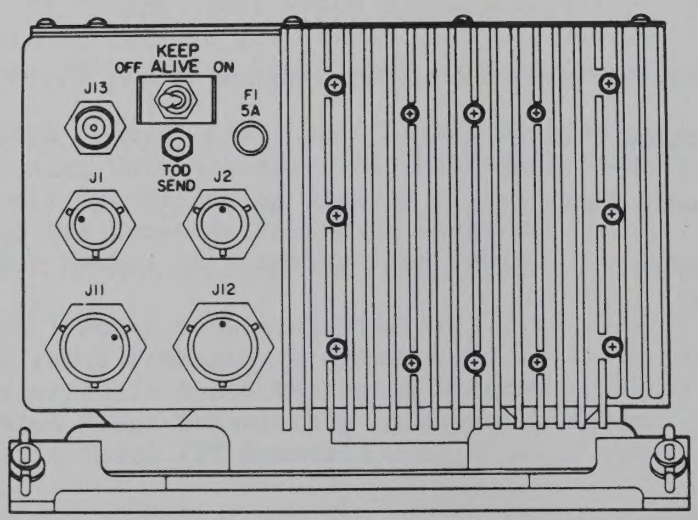


RADIO SET CONTROL
C-10904/URC-98



RADIO SET CONTROL
C-10905/URC-99



ELECTRICAL EQUIPMENT
MOUNTING BASE
MT-6165/URC

URC102-35A

Figure 1-1. Line Replaceable Units of Radio Sets AN/URC-98, AN/URC-98A and Radio Sets AN/URC-99, AN/URC-99A

SECTION I

DESCRIPTION

1-1. GENERAL. This manual contains intermediate level maintenance instructions for Radio Sets AN/URC-98, AN/URC-98A and AN/URC-99, AN/URC-99A shown in figure 1-1. The Line Replaceable Units (LRU) and their Shop Replaceable Unit (SRU) subassemblies are listed in table 1-1. The LRUs, their common names and usage, covered in this section are listed in table 1-7.

1-2. MAJOR CHARACTERISTICS. Radio Set AN/URC-98/98A and Radio Set AN/URC-99/99A operate in the 225.000 MHz to 399.975 MHz military band. They provide a 7000-channel uhf tuneable receiver; a nominal 243.000 MHz (tuneable from 238.000 to 248.000 MHz, with crystal replacement and realignment) auxiliary guard receiver; and a 7000-channel, 10 watt carrier transmitter for normal am voice communications and communications in the anti-jam (AJ) mode of operation.

1-3. CONFIGURATION DIFFERENCES. Radio Sets AN/URC-98 and AN/URC-99 differ from Radio Sets AN/URC-98A and AN/URC-99A in that they have different remote RTs and different Word-Of-Day (WOD) loading procedures. Radio Sets AN/URC-98A/99A contain an RT-1504 remote RT that incorporates several AJ mode enhancements and a multiple Word-Of-Day (MWOD) loading capability. Radio Sets AN/URC-98/99 contain either remote RT-1145A or RT-1145C and a single WOD loading capability. Table 1-7 illustrates the configuration differences of the radio sets. Refer to TO 12R2-2URC-101-1 (Radio Sets AN/URC-98/98A) or TO 12R2-URC-101-2 (Radio Sets AN/URC-99/99A) for specific differences between WOD and MWOD loading procedures.

1-4. PURPOSE OF EQUIPMENT. The radio sets provide ground-to-air and ground-to-ground normal voice and AJ communications in the 225.000 MHz to 399.975 MHz military band on 7000 separate channels.

1-5. MAINTENANCE CONCEPT. Maintenance instructions provide fault isolation to an SRU or subassembly. Fault isolation is accomplished through use of the minimum performance tests and trouble analysis procedures. Repair instructions for removal, replacement, and adjustment are provided following fault isolation.

1-6. CONTROLS, INDICATORS, AND CONNECTORS. Operating controls and indicators for the C-10904 control are shown in figure 1-2 and described in table 1-2. Controls for the MT-6165 mount are illustrated in figure 1-3 and described in table 1-3. Controls and indicators for the C-10905 control are shown in figure 1-4 and described in table 1-4.

1-7. PRESET CHANNEL SELECTION PROCEDURE. The procedure for presetting any of the 20 preset channels is as follows:

a. Set the function selector switch to the MAIN position.

b. Set the MANUAL-PRESET-GUARD (M-P-G) switch to the PRESET position.

c. Use the frequency selector switches to select the frequency to be placed in the memory.

d. Turn the channel switch to the desired channel number.

e. Press the PRESET switch. The frequency selected is displayed on the LED Frequency Display (figures 1-2 and 1-4).

f. Using a soft lead (eraseable) pencil, record the frequency selected for the channel number used on the chart provided on the front panel of the switching unit.

1-8. WOD LOADING PROCEDURE USING SINGLE WOD METHOD. The procedure for entering WOD into preset channels 20 through 15 is as follows:

NOTE

The single WOD loading method may be used for all versions of the Radio Sets.

a. Set the function selector switch to the MAIN position.

b. Set the M-P-G switch to the PRESET position.

c. Load 300.050 in preset 20, 376.000 in preset 19, 359.100 in preset 18, 314.300 in preset 17, 297.600 in preset 16, and 287.400 in preset 15. Select preset 20 and listen for a single beep. Rotate channel switch down from channel 19 through 16 listening for a single beep at each channel. Select channel 15 and listen for a double beep. The double beep indicates a complete WOD has been entered into the radio.

1-9. WOD LOADING PROCEDURE USING MWOD METHOD (URC-98A/99A ONLY). The following procedure describes the steps necessary to load MWOD data in the RT contained in URC-98A/99A. The MWOD loading procedure allows up to six WODs to be loaded into the RT. Each WOD is matched with a date code. Each WOD becomes valid only when the RT automatically updates time and the date code becomes current. The WODs and associated date codes are stored in non-volatile memory which retains the WODs when power is removed. Perform the following steps to load WODs using the MWOD method.

NOTE

The following procedure can only be used on the URC-98A and URC-99A.

a. Set M-P-G switch to PRESET and the channel switch to 20.

b. Set frequency selector switches to 220.025. Press PRESET button. You are now in the MWOD-load mode.

c. Set M-P-G switch to MANUAL.

NOTE

The WOD elements, date code and operational date are stored in memory locations 20 through 15, 14 and 1 respectively. This memory is located within the remote RT-1504 and is accessed using the channel switch. For training and maintenance, use the following WOD elements with the corresponding memory locations.

d. To load the WOD information, select the memory location (starting at 20) using the channel switch. Select the WOD element using the frequency selector switches. Press the TONE button and listen for a single beep. The WOD element is now loaded into memory.

MEMORY LOCATION	WOD ELEMENT
20	300.050
19	376.000
18	359.100
17	314.300
16	297.600
15	287.400
14	3AB.000 (date code)

e. Repeat step (d) to load the remaining WOD elements in memory locations 19 to 15.

f. Set channel switch to 14.

g. Using the Frequency Selector switches, enter the desired date code in the following format:

3AB.000

Where A= tens (1,2,or3), B = ones (0 through 9)
Examples:
for the first day of the month, enter 301.000
for the thirty-first day of the month, enter 331.000
for the thirteenth day of the month, enter 313.000

h. Press the TONE switch and listen for a double beep. One complete WOD has now been loaded.

i. Set the channel switch to 20 and repeat steps d through h as desired to load additional WODs.

NOTE

The RT will retain only the six most recently entered WODs. If a WOD is entered with the same date code as a previously entered WOD, the most recently entered WOD becomes valid for that date code.

NOTE

Once the WOD information has been entered, the operational date must also be entered. The operational date is the current day-of-month and must be entered into the system so the radio can select one of the MWODs for code generator initialization. To enter the operational date, proceed as follows.

j. Set the channel switch to 1.

k. Using the frequency selector switches, enter the operational date using the following format:

3AB.000

Where A = tens (1,2,or3), B = ones (0 through 9)
Examples:
for the first day of the month, enter 301.000
for the thirty-first day of the month, enter 331.000
for the thirteenth day of the month, enter 313.000

l. Press the TONE switch.

m. Set M-P-G switch to PRESET and the channel switch to 20.

n. Set Frequency Selector switches to 220.000. Press PRESET button. You are now in the verify/operate mode.

o. Set M-P-G switch to MANUAL.

NOTE

URC-98A/99A Only - If one of the five T-net numbers (A00.000-A00.400) is selected and a training WOD is loaded, the radio will operate in the T-net training mode and use the frequencies loaded in with the WOD. If one of the sixteen FMT-net numbers (A00.025-A01.525) is selected and a training WOD is loaded, the radio will operate in the FMT-net training mode and use the sixteen FMT-net frequencies. Selection of any other net number (those not specified as T-net or FMT-net) while operating in the training mode is illegal and will cause an alarm.

Refer to TO 12R2-2URC-101-1 or TO 12R2-2URC-101-2 as necessary for additional information on the various MWOD functions of Radio Set URC-98A or URC-99A respectively.

1-10. PERFORMANCE CHARACTERISTICS. Physical characteristics for the radio set are listed in table 1-5. Electrical characteristics are listed in table 1-6.

Table 1-1. Radio Set LRU's

Line Replaceable Unit	Description/Application
MT-6165/URC	Electrical Equipment Mounting Base Shop Replaceable Units (SRUs): Radio Frequency Oscillator 626404-1 Divider/Audio Circuit Card Assembly 811397-801 Power Supply 538667-802 DC to DC Converter 535299-1 Battery Assembly 810077-801
RT-1145A, RT-1145C or RT-1504/ARC-164(V)	Remote RT Mounted in the MT-6165 mount. Refer to TO 12R2-2ARC164-32 for SRUs.
C-10904/URC-98	Radio Set Control SRUs: Memory Subassembly 912323-802 Control Adapter MX-9708/ARC-164 Cable Assembly CX-12999/ARC-164 Switching Unit Panel Assembly SA-2323/URC-98
C-10905/URC-99	Radio Set Control SRUs: Memory Subassembly 912323-802 Wiring Harness 565669-801 Power Supply Circuit Card Assembly 918837-802 Switching Unit Panel Assembly 810586-801 SA-2061/ARC-164(V)

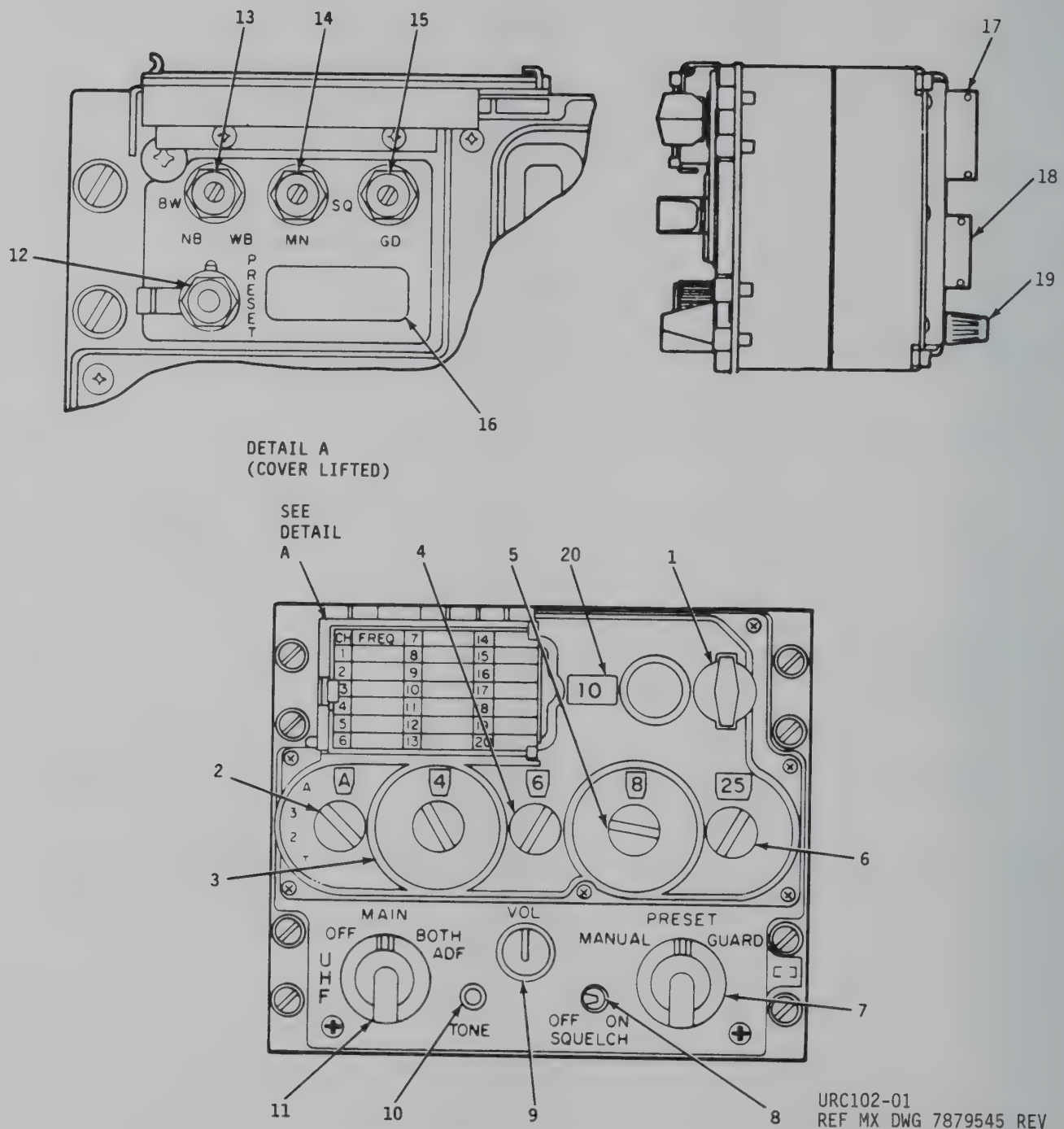


Figure 1-2. Radio Set Control C-10904/URC-98 Controls and Indicators

Table 1-2. Controls and Indicators for Radio Set Control C-10904/URC-98

Reference (Figure 1-2)	Nomenclature	Function
1	Channel Switch	In normal mode, allows storage of selected frequency and selection of stored frequency, in selected preset channel (1-19). In MWOD load mode, is used as memory location access switch (SYNTH/ECCM memory).
2	100 MHz/Mode Selector (T-2-3-A)	Selects 100's digit of frequency (either 2 or 3) in Normal mode. "A" position selects AJ mode. "T" position allows input of new Time-of-Day (TOD) for up to 1 minute after initiation. The "T" position is a momentary, spring-return position. "T" position, in conjunction with simultaneously pressing TONE switch (10), is used for emergency start-up of TOD clock when TOD is not available from external sources. This TOD will not be synchronized to Universal Coordinated Time (UTC).
3	10 MHZ Selector	Selects 10's digit of frequency (0 through 9).
4	1 MHz Selector	Selects unit's digit of frequency (0 through 9).
5	.1 MHz Selector	Selects tenth's digit of frequency (0 through 9).
6	.01 MHz Selector	Selects hundredth's and thousandth's digits of frequency (00, 25, 50, or 75)
7	MANUAL-PRESET-GUARD (M-P-G) Switch	Selects mode of frequency selection. MANUAL - Frequency is manually selected using the five frequency selector switches.

Table 1-2. Controls and Indicators for Radio Set Control C-10904/URC-98-Continued

Reference (Figure (1-2)	Nomenclature	Function
7-continued		PRESET - Frequency is selected using the Channel Selector Switch; also used when programming the 20 preset channels. GUARD - The main receiver and transmitter are automatically tuned to the guard frequency, and the guard receiver is disabled.
8	SQUELCH ON-OFF Switch	Enables and disables squelch of Main Receiver.
9	VOL Control	Adjusts audio level.
10	TONE switch	Transmits TOD, followed by a 1020 Hz tone on the selected frequency. In conjunction with T-2-3-A switch, starts TOD clock. When not in AJ mode, it operates as a tone transmission switch only. In MWOD loading mode, is used to load MWOD into memory.
11	Function Selector Switch	Selects operating mode. OFF - Shuts down equipment. MAIN - Enables main receiver and transmitter. BOTH - Enables main receiver and transmitter and guard receiver. ADF - Enables ADF or homing system (if installed) and main receiver. Disables guard receiver.
12	PRESET Switch	Stores selected frequency in selected preset channel (1-19) in Normal Mode or 1 through 14 in AJ Mode. In AJ mode, channels 15 through 20 are reserved for WOD. Is also used as mode change enable switch.

Table 1-2. Controls and Indicators for Radio Set Control C-10904/URC-98-Continued

Reference (Figure 1-2)	Nomenclature	Function
13	BW Switch (NB-WB)	Selects wide band or narrow band selectivity of main receiver.
14	SQ-MN (Squelch-Main) Control	Adjusts level of squelch for main receiver. Not used in this application.
15	SQ-GD (Squelch-Guard) Control	Adjusts level of squelch for guard receiver. Not used in this application.
16	LED Frequency Indicator	LED display indicates frequency currently addressed in memory.
17 & 18	Signal/Power Connectors	Connection point for signal/power cable plugs.
19	Fuse	A 2 ampere fuse which provides overload protection to input line.
20	Channel Indicator	Indicates channel utilized with channel selector switch.

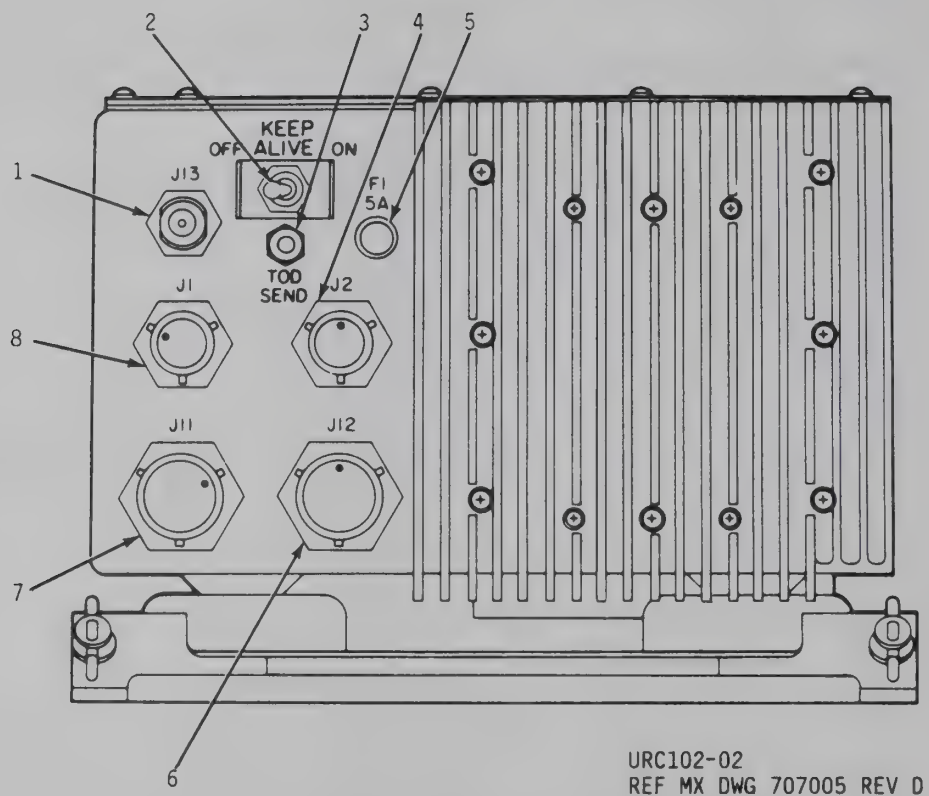


Figure 1-3. Electrical Equipment Mounting Base MT-6165/URC Controls

Table 1-3. Controls and Indicators for Electrical Equipment Mounting Base MT-6165/URC

Reference (Figure 1-3)	Nomenclature	Function
1	Antenna Connector	Provides connection for existing UHF antenna cable connector.
2	KEEP-ALIVE ON/OFF Switch	Connects internal 18 volt battery output to divider/audio board.
3	TOD SEND Switch	Transmits hardwire Time-of-Day.
4	Keep-Alive Power Connector	Connects cable from vehicle battery/ external generator power to maintain oscillator operation when main power is OFF. Not used for Radio Set AN/URC-99/99A functions.
5	Keep-Alive Power Fuse	A 5 ampere fuse which protects the keep-alive power input line to the DC/DC converter.
6&7	Signal/Power Connectors	Connection point for signal/power cable plugs.
8	Time-of-Day Connector	Connection point for a hard-wire Time-of-Day transfer.

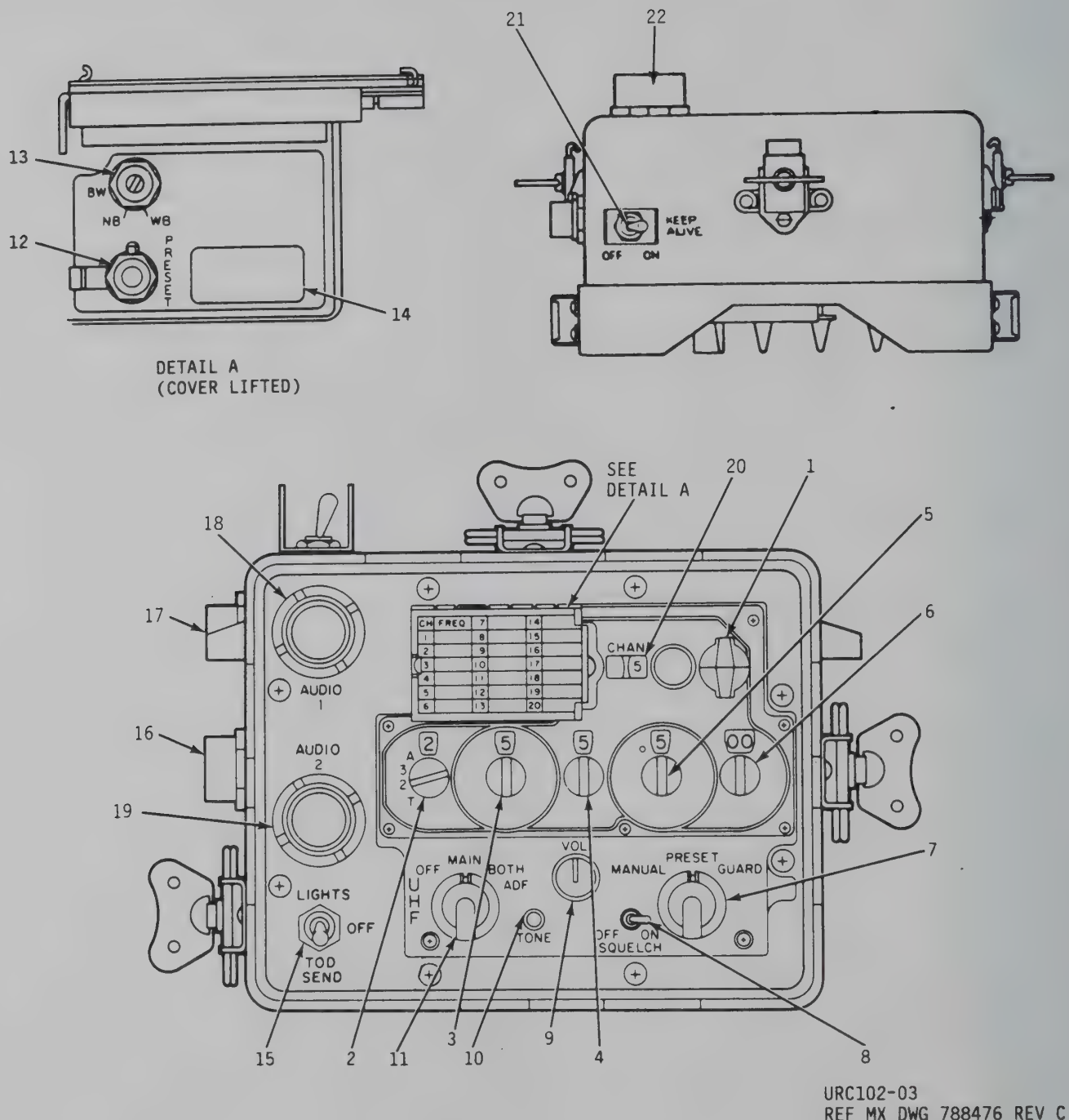


Figure 1-4. Radio Set Control C-10905/URC-99 Controls and Indicators

Table 1-4. Controls and Indicators for Radio Set Control C-10905/URC-99

Reference (Figure 1-4)	Nomenclature	Function
1	Channel Switch	In normal mode, allows storage of selected frequency and selection of stored frequency, in selected preset channel (1-19). In MWOD load mode, is used as memory location access switch (SYNTH/ECCM memory).
2	100 MHz/Mode Selector (T-2-3-A)	Selects 100's digit of frequency (either 2 or 3) in Normal mode. "A" position selects AJ mode. "T" position allows input of new Time-of-Day (TOD) for up to 1 minute after initiation. The "T" position is a momentary, spring-return position. "T" position, in conjunction with simultaneously pressing TONE switch (10), is used for emergency start-up of TOD clock when TOD is not available from external sources. This TOD will not be synchronized to Universal Coordinated Time (UTC).
3	10 MHZ Selector	Selects 10's digit of frequency (0 through 9).
4	1 MHz Selector	Selects unit's digit of frequency (0 through 9).
5	.1 MHz Selector	Selects tenth's digit of frequency (0 through 9).
6	.01 MHz Selector	Selects hundredth's and thousandth's digits of frequency (00, 25, 50, or 75)
7	MANUAL-PRESET-GUARD (M-P-G) Switch	Selects mode of frequency selection. MANUAL - Frequency is manually selected using the five frequency selector switches.

Table 1-4. Controls and Indicators for Radio Set Control C-10905/URC-99-Continued

Reference (Figure 1-4)	Nomenclature	Function
7-continued		PRESET - Frequency is selected using the Channel Selector Switch; also used when programming the 20 preset channels. GUARD - The main receiver and transmitter are automatically tuned to the guard frequency, and the guard receiver is disabled.
8	SQUELCH ON-OFF Switch	Enables and disables squelch of Main Receiver.
9	VOL Control	Adjusts audio level.
10	TONE switch	Transmits TOD, followed by a 1020 Hz tone on the selected frequency. In conjunction with T-2-3-A switch, starts TOD clock. When not in AJ mode, it operates as a tone transmission switch only. In MWOD loading mode, is used to load MWOD into memory.
11	Function Selector Switch	Selects operating mode. OFF - Shuts down equipment. MAIN - Enables main receiver and transmitter. BOTH - Enables main receiver and transmitter and guard receiver. ADF - Enables ADF or homing system (if installed) and main receiver. Disables guard receiver.

Table 1-4. Controls and Indicators for Radio Set Control C-10905/URC-99-Continued

Reference (Figure 1-4)	Nomenclature	Function
12	PRESET Switch	Stores selected frequency in selected preset channel (1-19) in Normal Mode or 1 through 14 in AJ Mode. In AJ mode, channels 15 through 20 are reserved for WOD. Is also used as mode change enable switch.
13	BW Switch (NB-WB)	Selects wide band or narrow band selectivity of main receiver.
14	LED Frequency Indicator	LED display indicates frequency currently addressed in memory.
15	LIGHTS/TOD SEND Switch	In LIGHTS position, illuminates the panel lights. In TOD SEND position will cause radio set to transmit hardwire Time-of-Day.
16	External Time-of-Day Connector	Connection for a hard-wired external time-of-day source.
17	External Speaker Connector	Connection point for external speaker.
18 & 19	AUDIO 1, AUDIO 2 Connectors	Connection for H-33F/PT Handsets or for AN/GRA-6 Control Group.
20	Channel Indicator	Indicates channel utilized with channel selector switch.
21	Keep-Alive Switch	Switches the application of internal and external power to the Keep-Alive circuit.
22	Signal/Power Connector	Connection point for signal/power cable plugs.

Table 1-5. Physical Characteristics

Characteristic	Description
GENERAL	
Equipment Compatibility	
COMMUNICATION SYSTEMS	AN/MRC-107 and AN/MRC-108 Communication Centrals
Operating Temperature	-54° to +60°C
Storage Temperature	-62° to +85°C
Altitude	50,000 ft (15.24 km) max
Vibration	5 g's at 2000 Hz
Shock	50 g's 11 milliseconds duration
RECEIVER-TRANSMITTERS RT-1145A or RT-1145C (URC-98/99) RT-1504/ARC-164(V) (URC-98A/99A)	
Width	4.98 in 12.65 cm
Height	4.73 in 12.03 cm
Depth*	8.25 in 20.96 cm
Weight	8.50 lb 3.86 kg
ELECTRICAL EQUIPMENT MOUNTING BASE MT-6165/URC	
Width	9.51 in 24.16 cm
Height	7.08 in 17.97 cm
Depth*	16.94 in 43.03 cm
Weight	27 lb 12.25 kg
RADIO SET CONTROL C-10904/URC-98	
Width	5.75 in 14.58 cm
Height	4.88 in 12.38 cm
Depth*	5.34 in 13.56 cm
Weight	4.32 lb 1.96 kg
RADIO SET CONTROL C-10905/URC-99	
Width	7.50 in 19.05 cm
Height	6.25 in 15.88 cm
Depth*	5.34 in 13.56 cm
Weight	5.31 lb 2.49 kg

*Depth dimension includes projecting controls and connectors.

Table 1-6. Electrical Characteristics

Characteristic	Description
GENERAL	
Frequency Range	225.00 to 399.975 MHz
Transmitter Power Out	10 watts
Receiver Sensitivity	4 µV for 10 dB S+N/N at 30% modulation
Available Channels	7000
Channel Spacing	0.025 MHz
Preset Channels	20 available in Normal mode; For RT-1504, channel 20 is reserved for MWOD mode selection. For RT-1145A or RT-1145C, channels 15 through 20 reserved for WOD elements. (Any presets, 19 through 15, not used for WOD can be used for normal preset.)
Memory Type	MNOS, CMOS RAM, CMOS EPROM, CMOS EEPROM
Operating Modes	AM Voice Tone Secure Speech (KY-58 only in AJ mode) AJ
Operating Voltage	+27.5 Vdc (Standard Condition) +24 to +33 Vdc (Service Condition) +18 Vdc (Emergency Condition)
Input Power	Remote RT Receive - 30 watts Transmit - 105 watts Control - 10 watts
Warmup Time	Remote RT - 2 seconds Rubidium Oscillator - 10 minutes
Antenna Impedance	52 ohms

Table 1-7. LRU Configurations

Equipment	AN/URC- 98	98A	99	99A
1. Mounting Base				
a. Electrical Equipment Mounting Base MT-6165/URC	X	X	X	X
2. Control Unit				
a. Radio Set Control C-10905/URC-99			X	X
b. Radio Set Control C-10904/URC-98	X	X		
3. Remote RT				
a. RT-1145A/ARC-164(V) Have Quick modified	X		X	
b. RT-1145C/ARC-164(V) Have Quick modified, 25 kHz channel separation	X		X	
c. RT-1504/ARC-164(V) Have Quick modified, 25 kHz channel separation, AJ enhancements, MWOD capability		X		X

SECTION II

SPECIAL TOOLS AND TEST EQUIPMENT

2-1. GENERAL. This section contains a listing of special tools and test equipment required for intermediate level maintenance of Radio Sets AN/URC-98, AN/URC-98A and Radio Sets AN/URC-99, AN/URC-99A (radio sets).

2-2. SPECIAL TOOLS. No special tools are required.

2-3. TEST EQUIPMENT. The test equipment described in Section II of TO 12R2-2ARC164-32 is required. Table 2-1 lists the functions of the cables of Radio Test Set TS-3919/ARM-173 required for maintenance of the radio sets.

Table 2-1. Support Equipment For Intermediate Level Maintenance

Type Designation	Nomenclature	Use
565750-801	Cable Assembly	Connects MT-6165 mount connectors J11 and J12 to connector J4 of the test adapter MX-10246.
565751-801	Cable Assembly	Connects C-10905 control connector J1 to connector J5 of the test adapter MX-10246.

SECTION III

THEORY OF OPERATION

3-1. GENERAL. Theory of operation for the AN/URC-98/98A and AN/URC-99/99A Radio Sets is presented in this section. Theory of operation is presented as a functional description of the radio sets at the Shop Replaceable Unit (SRU) level. Theory of operation for the remote RTs, mounted in but not part of the mounting base, is found in TO 12R2-2ARC164-32. Line Replaceable Units (LRUs) covered in this section are:

Electrical Equipment Mounting Base MT-6165/URC (MT-6165 mount)
Radio Set Control C-10904/URC-98 (C-10904 control)
Radio Set Control C-10905/URC-99 (C-10905 control)

3-2. ELECTRICAL EQUIPMENT MOUNTING BASE MT-6165/URC. Figure 3-1 is a functional block diagram of the MT-6165 mount. Figure FO-1 is a schematic diagram of the MT-6165 mount. The MT-6165 mount contains five SRU's and connections for mounting a remote RT. The SRU's consist of a Rubidium Oscillator, Y1; Divider/Audio circuit card assembly, A2; Power Supply, PS1; DC/ DC Converter, PS2; and Battery, BT1.

a. Oscillator. Operating voltage for the precision rubidium oscillator is 27.5 Vdc from the DC/DC Converter, PS2. The oscillator requires approximately 10 minutes from cold start to reach operating temperature. Until an internal thermistor indicates operating temperature is reached, operation from the 18 Vdc Battery is prevented. The oscillator output is 10 MHz, applied to the Divider/Audio board, A2.

b. Power Supply. The only outputs of the power supply used in this application are +6.2 and +12 Vdc. Input to the power supply is 27.5 Vdc from the DC/DC Converter. The power supply outputs are supplied to the divider/audio board, A2.

c. DC/DC Converter. The input to the DC/DC Converter is 18 to 32 Vdc from an external source or from the internal 18 volt Battery, BT1. The DC/DC Converter, PS2, outputs 27.5 Vdc to the Rubidium Oscillator, Y1, and Power Supply, PS1.

d. Battery. The 18 volt battery provides operating voltage to the DC/DC Converter to maintain the oscillator frequency during changeover between system power sources. During normal operation the battery is charged through a regulator on the divider/audio board. External power must be supplied to the system initially to actuate a relay on the divider/audio board before the battery will pick up the load. KEEP ALIVE switch, S1, set to ON, connects the battery to the divider/audio board. Switch S1 should be set to OFF when the system is not operating to prevent battery discharge.

e. Divider/Audio Board. Divider/Audio board circuits provide frequency interface and monitoring between the oscillator and the radio, battery charging and power connection for the DC/DC converter, audio amplification, and voltage regulation.

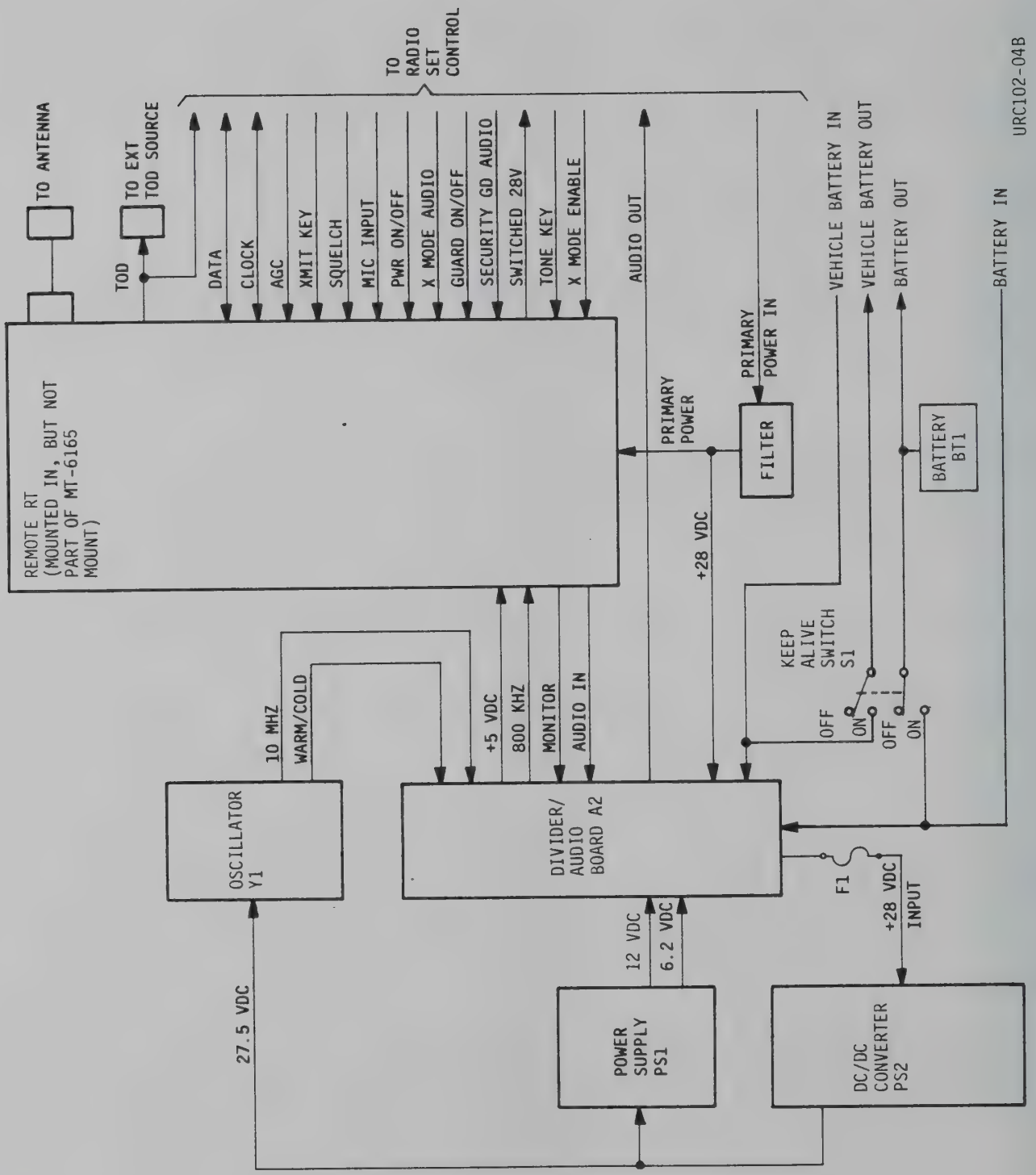


Figure 3-1. MT-6165 Mount Block Diagram

(1) Frequency Interface/Monitoring. The 10 MHz from the oscillator is divided down to 800 kHz. The 800 kHz is output to the radio and also applied to long and short period detectors. Detection of a pulse width greater than 1.5 ms or less than 1 ms will cause the monitor line to the radio to go low for at least 20 ms.

(2) Battery Charger/Converter Power. A voltage regulator/battery charger circuit provides charging current at 21.5 volts for the 18 volt battery, BT1 (when external 18 to 32 Vdc power is supplied) and operating power for the DC/DC converter.

(3) Audio Amplification. Received audio signals from the radio are amplified and applied to the radio set control.

(4) Voltage Regulation. The 6.2 Vdc from the power supply is filtered and regulated to 5 Vdc for use in the board circuits and for application to the radio. The 12 Vdc is filtered and used as operating voltage in board circuits.

3-3. RADIO SET CONTROL C-10904/URC-98. Figure 3-2 is a block diagram of the C-10904 control. The C-10904 control contains the Frequency Channel Switching Unit SA-2323/URC-98 (switching unit), A1, the Control Adapter MX-9708/ARC-164 (control adapter), A2, and the Wiring Harness CX-12999/ARC-164 (wiring harness), W6. The C-10904 control is used on both AN/URC-98/98A.

a. Switching Unit. Figure FO-2 is a block diagram of the switching unit. The switching unit contains a memory subassembly, A1, an interface subassembly, A2, and the switches used to control the radio modes and frequencies. Figure FO-3 is a schematic of the switching unit.

(1) Memory. The memory subassembly provides circuits to allow presetting 20 of the 7000 possible channels into the radio set. Any one of the 20 preset channels can then be used by operator selection of the desired channel (or WOD on 15 thru 20) using one rotary selection switch. The current frequency selected is displayed on the LED Frequency Display on the memory (see figure 1-2). The memory subassembly also provides circuits to convert parallel frequency control data to serial data for remote use. Table 3-1 is a list of serial data bit information. Figure 3-3a is a sample serial data bit timing diagram for normal mode and figure 3-3b is a sample serial data bit timing diagram for AJ mode.

(2) Interface Subassembly. The interface subassembly provides interconnecting circuits (containing isolation diodes) between the switching unit and other SRU's of the radio.

(3) Lighting Options. The switching unit assembly also contains an illuminated panel subassembly to provide the interface for either the 5 volt or 28 volt lighting option.

(4) Controls. Controls on the switching unit assembly are used to perform the following functions:

(a) Activate power on/off signal
(b) Adjust volume
(c) Enable and disable main receiver squelch
(d) Select one of 20 preset channels
(e) Select one of 7000 channels
(f) Select operating mode
(g) Select mode of frequency selection
(h) Enable transmission of a 1020 Hz tone.
(i) Select either wideband or narrowband (if) operation
(j) Select either AJ or Normal mode
(k) Start TOD clock
(l) Transmit TOD
(m) Enter WOD

b. Control Adapter, A2. The control adapter contains a dc-to-dc power supply which converts a 28 Vdc input to +12 Vdc and +6.2 Vdc outputs.

c. Wiring Harness, W6. Figure FO-4 is a schematic of the wiring harness. The wiring harness provides interconnection between SRUs of the C-10904 control and external cables.

3-4. RADIO SET CONTROL C-10905/URC-99. Figure 3-4 is a block diagram of the C-10905 control. The C-10905 control contains two major assemblies; the Audio Switching Assembly, A1, and the wiring harness assembly, W1. The C-10905 control is used on both AN/URC-99/99A.

a. Audio Switching Assembly. The audio switching assembly contains the memory subassembly, A1, the power supply circuit card assembly, A2, and the switching unit panel assembly, A3.

(1) Memory Subassembly. The MNOS memory is the same as described in paragraph 3-3a.(1) of this manual.

(2) Power Supply Circuit Card Assembly. The power supply circuit card assembly is a dc-to-dc power supply/regulator which converts a 28 Vdc input to +12 Vdc and +6.2 Vdc outputs.

(3) Switching Unit Panel Assembly. Figure FO-5 is a schematic of the switching unit panel assembly. The switching unit panel assembly contains the audio interface circuit card assembly, A1; the interface circuit card assembly, A2; and the channel select switch assembly, A3.

(a) Audio Interface Circuit Card Assembly, A1. This subassembly contains the audio connectors (AUDIO 1 and AUDIO 2) for attaching handsets and coupling of audio signal lines within the audio switching assembly.

(b) Interface Circuit Card Assembly, A2. This subassembly consists of isolation diodes between the panel controls and the external connector.

(c) Channel Select Switch Assembly, A3. This subassembly contains the preset channel selector switches.

b. Wiring Harness Assembly, W1. Figure FO-6 is an interconnect diagram of the wiring harness assembly. In addition to the wires and connectors, the harness contains the audio circuit card assembly. The audio circuit card assembly contains an impedence matching circuit for receive audio and a filter network for 28 Vdc.

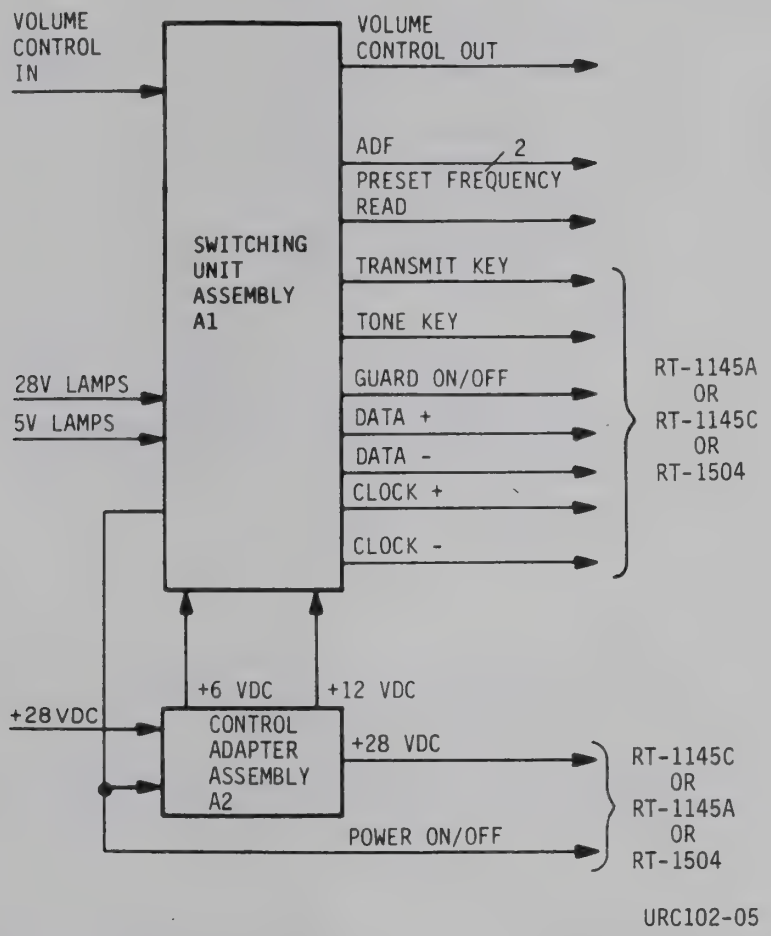
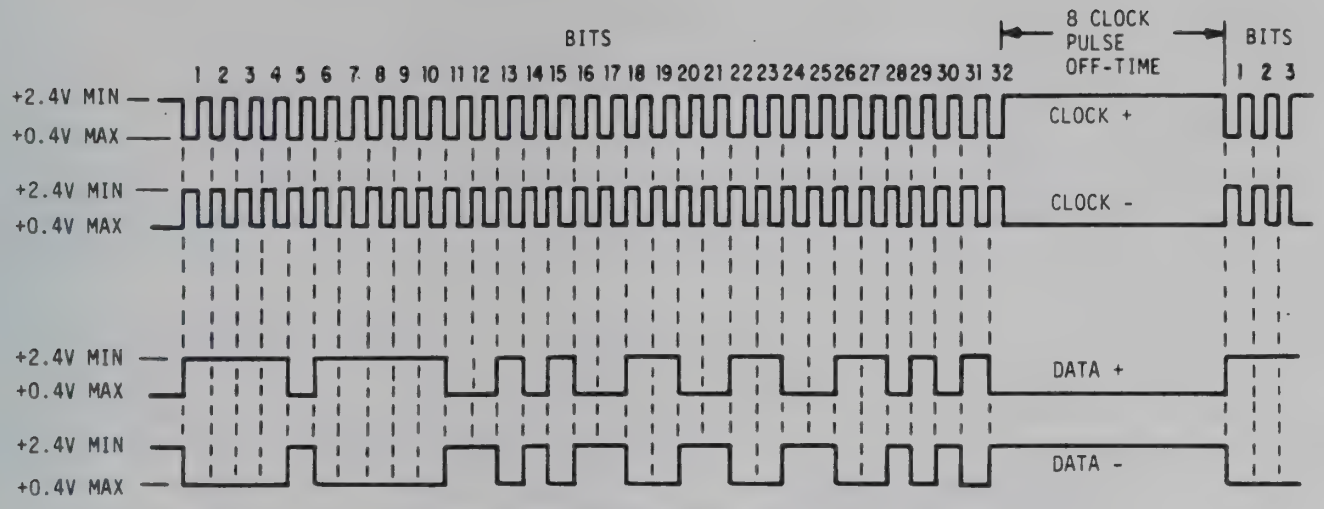


Figure 3-2. Radio Set Control C-10904/URC-98 Block Diagram

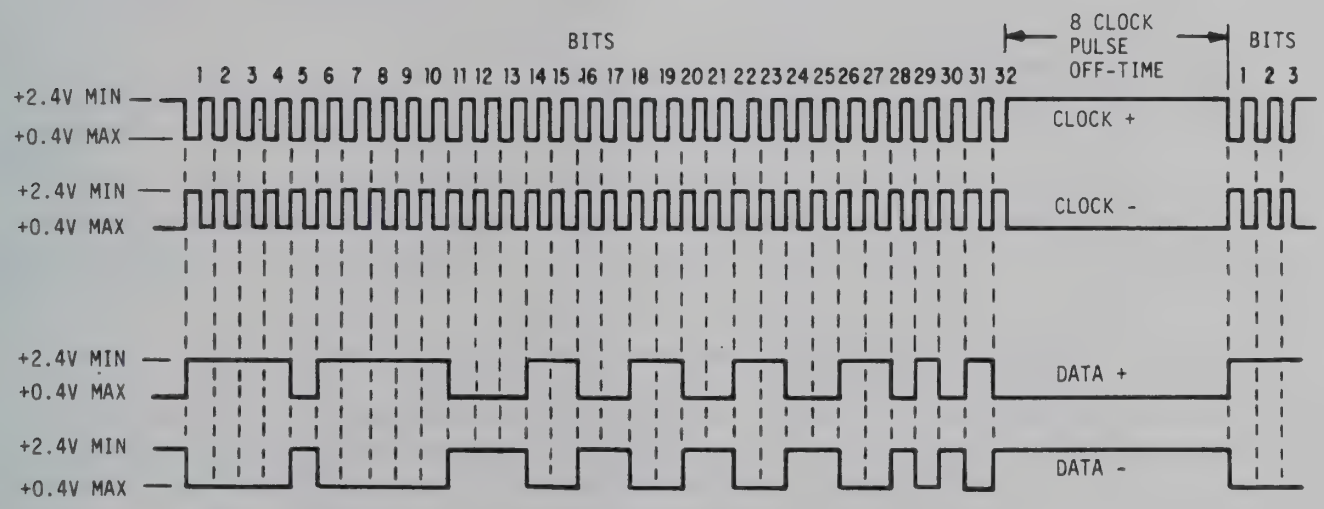
Table 3-1. Serial Data Bit Information

Bit no.	Function		
1	Chan. Sel. 1	-	0 for Chan. 1 or 11
2	Chan. Sel. 2	-	0 for Chan. 2 or 12
3	Chan. Sel. 3	-	0 for Chan. 3 or 13
4	Chan. Sel. 4	-	0 for Chan. 4 or 14
5	Chan. Sel. 5	-	0 for Chan. 5 or 15
6	Chan. Sel. 6	-	0 for Chan. 6 or 16
7	Chan. Sel. 7	-	0 for Chan. 7 or 17
8	Chan. Sel. 8	-	0 for Chan. 8 or 18
9	Chan. Sel. 9	-	0 for Chan. 9 or 19
10	Chan. Sel. 10	-	0 for Chan. 10 or 20
11	Chan. Sel. 11	-	0 for Chan. 1-9 & 20; 1 for Chan. 10-19
12	M-P-G/AJ	-	0 for Manual (Normal Mode) or A/T (AJ Mode) 1 for Preset and Guard (Normal Mode)
13	M-P-G/AJ	-	0 for Guard (Normal Mode) or A/T (AJ Mode) 1 for Manual and Preset (Normal Mode)
14	200/300 MHz	-	0 = 200, 1 = 300
15	10 MHZ		
16	20 MHZ		
17	40 MHZ		
18	80 MHZ		
19	1 MHZ		
20	2 MHZ		
21	4 MHZ		Positive Logic BCD
22	8 MHZ		
23	0.1 MHZ		
24	0.2 MHZ		
25	0.4 MHZ		
26	0.8 MHZ		
27	.05 MHZ	-	1 = .05 MHz
28	.025 MHZ	-	0 = .025 MHz
29	WB/NB-A/T	-	0 = WB, T 1 = NB, A
30	Squelch Disable	-	0 = Disable
31	Spare	-	Always Logic 1
32	Spare	-	Always Logic 0



NOTES:
1. DATA BITS CHANGE ON NEGATIVE-GOING EDGES OF CLOCK + OUTPUT.
2. BIT 1 IS FIRST BIT OUT OF REGISTER.
3. CLOCK FREQUENCY = 620 HZ ±20%.
4. CONDITIONS DESCRIBED BY DATA BITS ABOVE:
   (A) MANUAL MODE
   (B) PRESET CHANNEL SELECT SWITCH AT 5
   (C) MANUAL OPERATING FREQUENCY SELECTED - 299.975 MHZ
   (D) NB-WB SWITCH IN NB (BIT 29 HIGH, LOGIC 1)
   (E) SQUELCH ON-OFF SWITCH IN OFF (BIT 30 LOW, LOGIC 0)

(a) Normal Mode



NOTES:
1. DATA BITS CHANGE ON NEGATIVE-GOING EDGES OF CLOCK + OUTPUT.
2. BIT 1 IS FIRST BIT OUT OF REGISTER.
3. CLOCK FREQUENCY = 620 HZ ±20%.
4. CONDITIONS DESCRIBED BY DATA BITS ABOVE:
   (A) AJ MODE (BITS 12 AND 13 BOTH LOW, LOGIC 0)
   (B) PRESET CHANNEL SELECT SWITCH AT 5
   (C) MANUAL FREQUENCY SELECTOR SWITCHES AT A99.975
   (D) A SELECTED (BIT 29 HIGH, LOGIC 1)
   (E) SQUELCH ON-OFF SWITCH IN OFF (BIT 30 LOW, LOGIC 0)

(b) ECCM Mode

URC102-14

Figure 3-3. Sample Serial Data Bit Timing Diagram

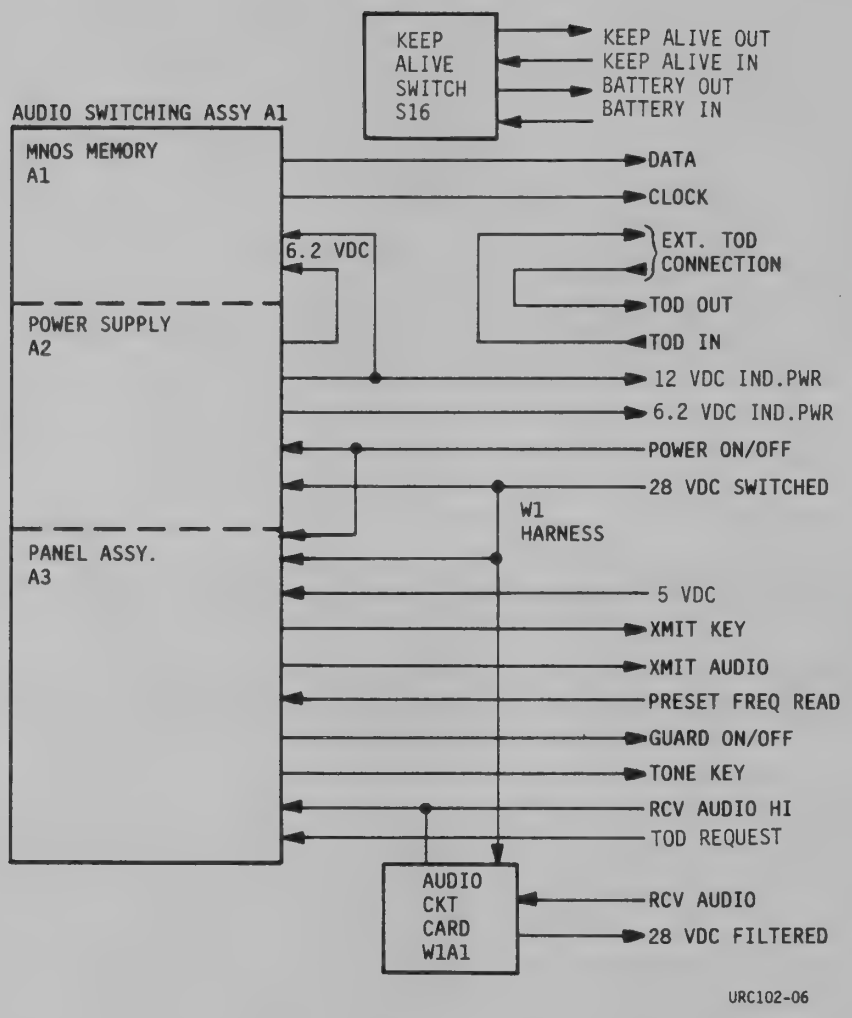


Figure 3-4. Radio Set Control C-10905/URC-99 Block Diagram

SECTION IV

DESCRIPTION OF SYSTEM TIE-IN OF EQUIPMENT AND ACCESSORIES

4-1. GENERAL. This section contains interconnecting information for configurations of the AN/URC-98, AN/URC-98A and AN/URC-99, AN/URC-99A Radio Sets (radio sets) and other equipment.

4-2. AN/ARC-51BX REPLACEMENT. The Radio Sets are direct replacements for the AN/ARC-51BX Radio Set as described in the following paragraphs.

4-3. RADIO SET AN/URC-98/98A. The radio sets are a direct replacement for the AN/ARC-51BX Radio Set in the AN/MRC-107A Communications Central. Replacement consists of the following:

a. Radio Set Control C-10904/URC-98 replaces Radio Set Control C-6476 in the UHF Remote Control Panel C-6904/MRC-107.

b. Electrical Equipment Mounting Base MT-6165/URC and incorporated remote RT (see note) replace UHF Transceiver RT-742/ARC-51BX and Mount MT-2652/ARC.

NOTE

The AN/URC-98 contains an RT-1145A or RT-1145C/ARC-164(V) within Mounting Base MT-6165/URC. The AN/URC-98A contains an RT-1504/ARC-164(V) within Mounting Base MT-6165/URC.

c. Electrical connection is unchanged except for the addition of a keep-alive power cable to maintain the precision oscillator frequency during standby operation.

4-4. RADIO SET AN/URC-99/99A. The radio sets are a direct replacement for the AN/ARC-51BX Radio Set in the AN/MRC-108 Communication Central. Replacement consists of the following:

a. Radio Set Control C-10905/URC-99 replaces UHF Radio Set Control 313V-4.

b. Electrical Equipment Mounting Base MT-6165/URC and incorporated remote RT (see note) replace UHF Transceiver RT-742/ARC-51BX and Mount MT-2652/ARC. These units are part of the VHF/UHF Radio Receiver-Transmitter Group 718M-2.

NOTE

The AN/URC-99 contains an RT-1145A or RT-1145C/ARC-164(V) within Mounting Base MT-6165/URC. The AN/URC-99A contains an RT-1504/ARC-164(V) within Mounting Base MT-6165/URC.

c. Electrical connections are unchanged except for the replacement of the antenna coaxial cable with a new, longer, antenna coaxial cable and the addition of a keep-alive power cable to maintain the precision oscillator frequency during standby operation.

SECTION V

SYSTEM CHECKOUT

5-1. GENERAL. System checkout of the AN/URC-98/98A and AN/URC-99/99A Radio Sets consists of minimum performance testing and alignment procedures. The minimum performance test and alignment procedures for the Receiver-Transmitter RT-1145A, RT-1145C or RT-1504/ARC-164(V) (remote RT) are provided in section V of TO 12R2-2ARC164-32 with modifications as indicated in the following notes.

NOTE

Modify the minimum performance test procedures to change the rf signal generator internal modulation from 90% to 50% in the AUDIO OUTPUT X-MODE portion of the test. Change the audio oscillator output level from 0.7 Vac to 0.5 Vac in the NORMAL MODULATION AND SIDETONE portion of the test.

NOTE

Modify the alignment procedures to change the rf signal generator internal modulation from 90% to 50% in the AUDIO OUTPUT portion of the procedure. Change the audio oscillator output level from 0.7 Vac to 0.5 Vac in the NORMAL AUDIO INPUT portion of the procedure.

5-2. INTERMEDIATE MAINTENANCE CONCEPT. Intermediate level maintenance consists of repair of LRU's identified previously as malfunctioning at the organizational level or during bench check of an LRU to determine serviceability. The system tests given in this section are intended for use in a "hot mock-up" concept. An LRU is substituted in the system for the test standard LRU. When a fault has been verified using the test procedures, refer to the applicable maintenance section for the individual LRU.

NOTE

Performance of the complete test procedure on each LRU returned for repairs is not necessary. Only that portion relating to the reported malfunction need be performed. The complete test procedure may be performed when a bench check of the LRU is required to determine serviceability or when additional information as to the nature of a suspected malfunction is required.

5-3. MINIMUM PERFORMANCE. The test procedure given in table 5-1 can be used for all radio set configurations. Figure 5-1 illustrates the test setup for the MT-6165 mount. Figure 5-2 illustrates the test setup for the C-10904 control. Figure 5-3 illustrates the test setup for the C-10905 control. Figures 5-4 and 5-5 illustrate the receive and transmit test setups respectively for the remote RT. These setups shall be used in conjunction with the MAIN RECEIVER, GUARD RECEIVER and TRANSMITTER tests as outlined in table 5-1 of TO 12R2-2ARC164-32.

NOTE

The correct frequency is not displayed on the AN/ARM-173. The correct frequency is only displayed on the indicator.

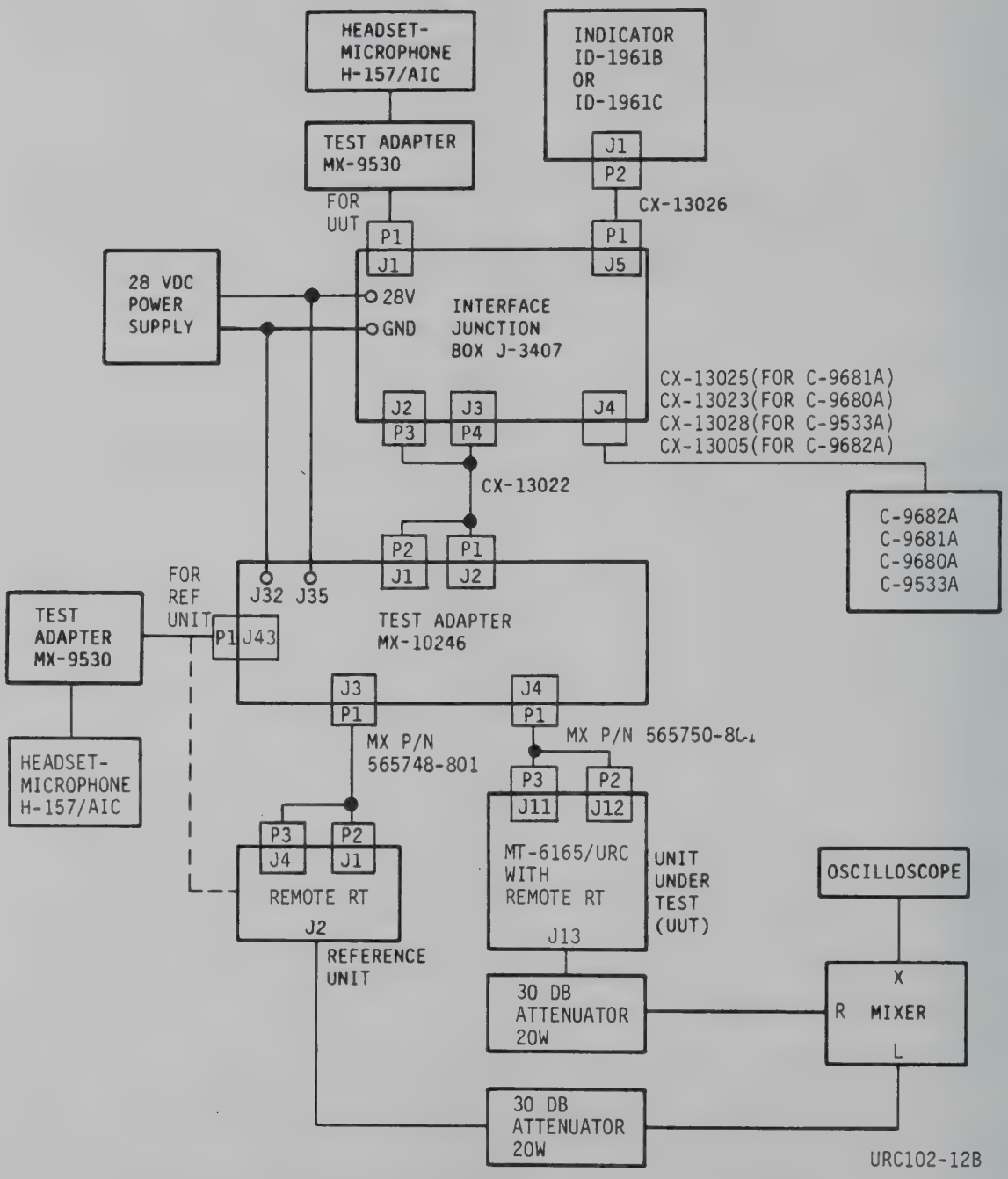


Figure 5-1. MT-6165 Mount Test Setup

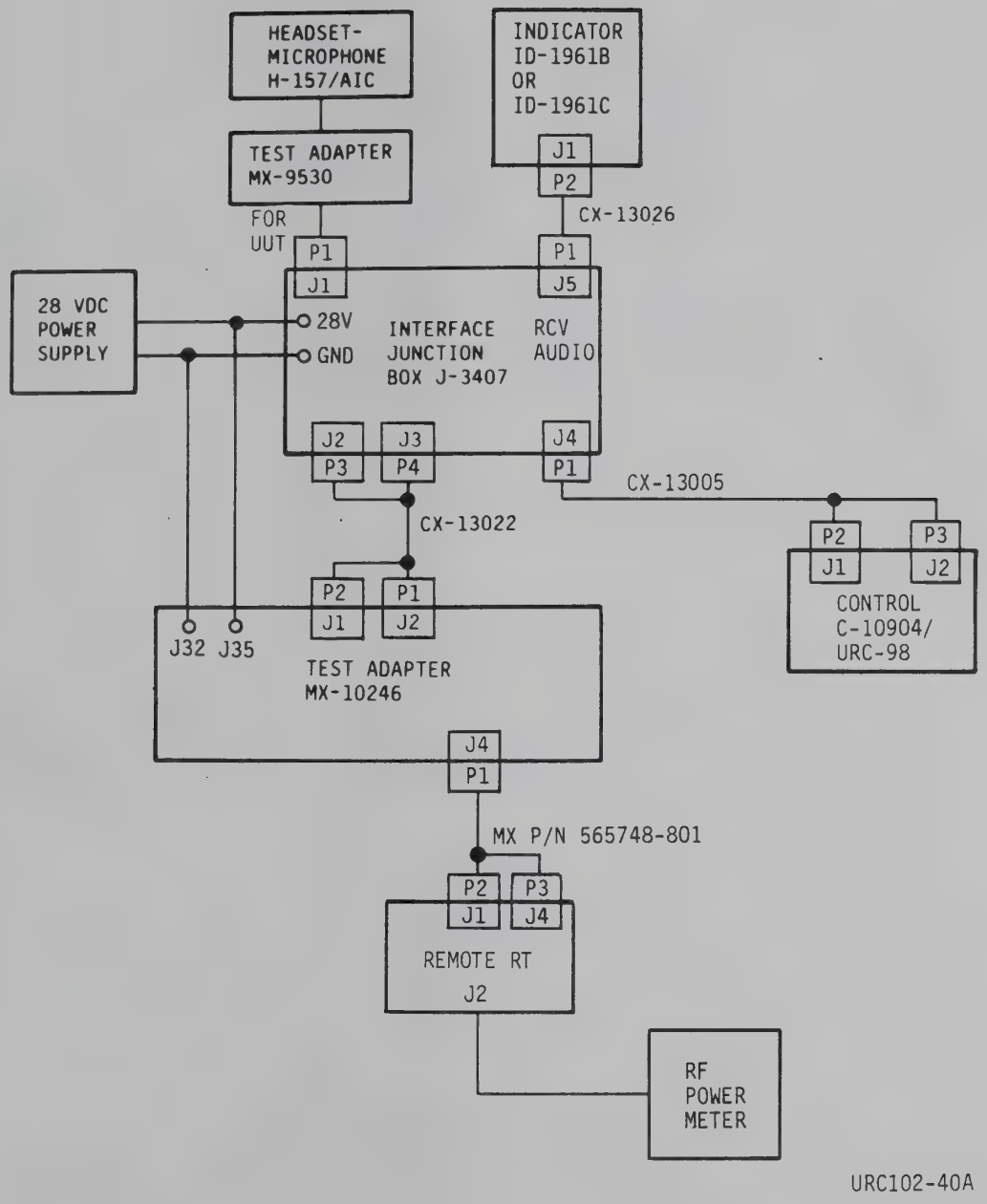


Figure 5-2. C-10904 Control Test Setup

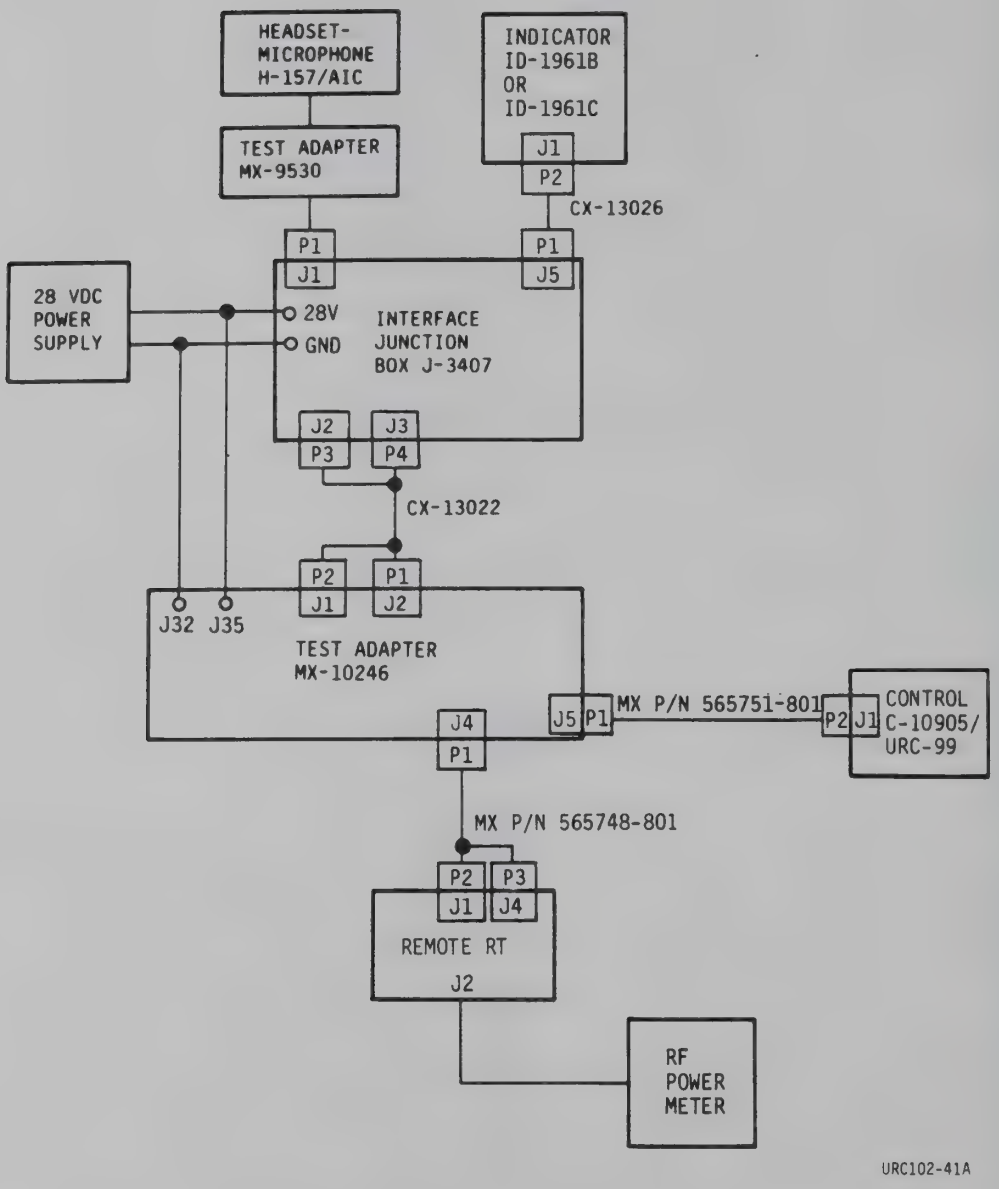


Figure 5-3. C-10905 Control Test Setup

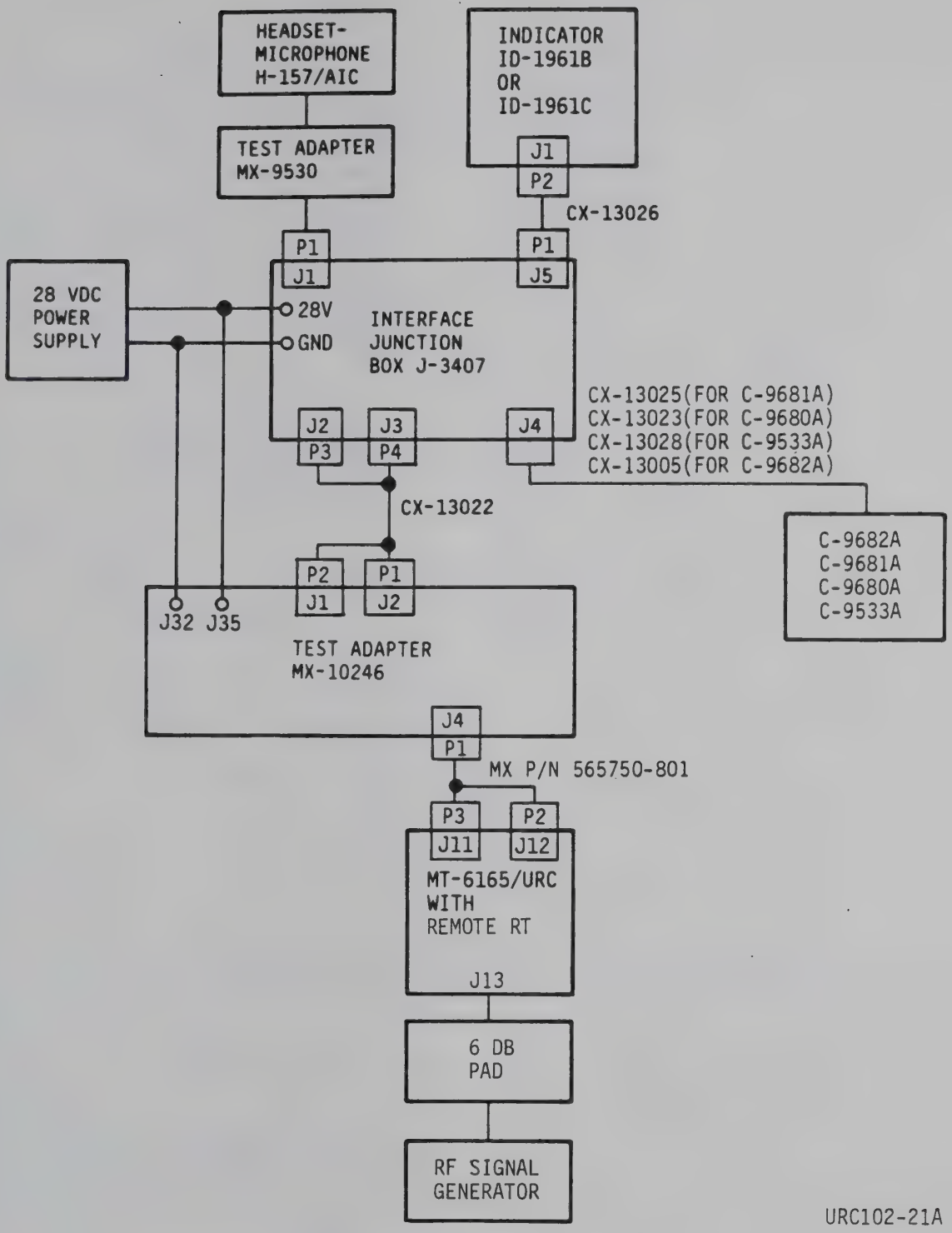


Figure 5-4. Remote RT Receive Test Setup

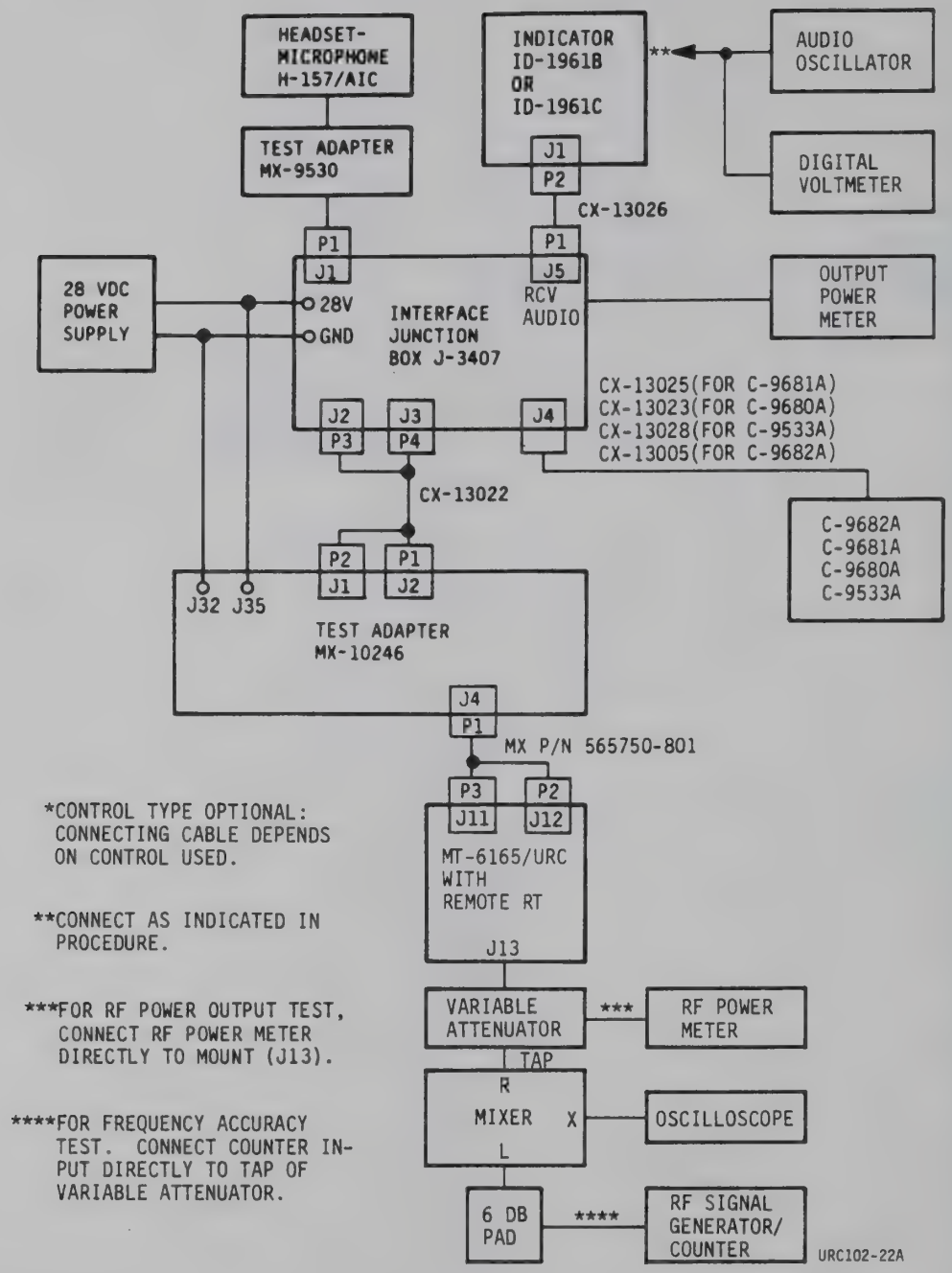


Figure 5-5. Remote RT Transmit Test Setup

Table 5-1. System Minimum Performance Test

Step	Procedure	Required indication
	NOTE Use figures 5-4 and 5-5 for the receive and transmit test setups respectively and perform the MAIN RECEIVER, GUARD RECEIVER and TRANSMITTER portions of table 5-1 in TO 12R2-2ARC164-32.	
	NOTE Perform procedures specified in steps 1 through 35 to test the MT-6165 mount. Perform procedures specified in steps 36 through 60 to test the C-10904 or the C-10905 control.	
	MT-6165 Mount	
1.	Connect equipment as shown in figure 5-1. On the MT-6165 mount, set the KEEP-ALIVE ON/OFF switch to ON.	
	NOTE Unless otherwise specified, all tests are to be conducted with the BW (bandwidth) switch in the WB (wideband) position.	
2.	On the MX-10246/ARM-173 Test Adapter (test adapter), set the following switches to the positions indicated. Switch — Position BTRY PWR - S2 — OFF TOD HARDWIRE - S3 — OFF NORM PWR - S4 — ON STD KEY ON - S5 — OFF RFO - S6 — OPEN SERIAL CONTROL - S7 — BOTH TAKE CONTROL - S8 — RT-1168A STD POWER CONTROL - S9 — OPEN VOLUME CONTROL - S10 — COMM	

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
2.-Cont	KEEP ALIVE - S11 OFF TOD - S12 Either POWER - S1 ON	
3.	On the J-3407/ARM-173 Interface Junction Box (test set), set the following switches to the positions indicated. Switch — Position X-MODE ENABLE — OFF XMIT KEY — Mid (off) TONE KEY — Mid (off) PRESET READ — CHAN TAKE CONTROL — CONT METER INPUT — CONT (to monitor current of control unit) RT (to monitor current of remote RT) PRIME POWER ON/OFF — ON	
4.	Set switching unit controls to the following positions. Switch — Position Function Selector — MAIN M-P-G (MANUAL-PRESET-GUARD) — PRESET Manual Frequency Selectors — 312.500 Preset Channel Selector — 20 VOL (volume) control — Midpoint SQUELCH switch — ON **NOTE** Prior to proceeding to step 5, refer to paragraph 1-3 to determine which radio set configuration is being tested (if unknown).	Indicator reads 20.
5.	Load the following WOD information using the single WOD method given in paragraph 1-8 (all configurations) or the MWOD method given in paragraph 1-9 (URC-98A/99A only).	

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
	CHANNEL : WOD ELEMENT 20 : 300.050 19 : 376.000 18 : 359.100 17 : 314.300 16 : 297.600 15 : 287.400 14 : 301.000 (MWOD only) 1 : 301.000 (MWOD only)	
	NOTE If WOD was loaded single WOD method, proceed to step 10. If WOD was loaded MWOD method, proceed to next step.	
6.	Remove power from switching unit, test adapter and test set. Switch positions of UUT and reference unit by exchanging connectors at J3 and J4 on test adapter.	
7.	Return power to test set, test adapter and switching unit in that order. Repeat step 5 to load WOD information (MWOD method) into reference unit (now in UUT position).	
8.	Remove power from switching unit, test adapter and test set. Switch positions of UUT and reference unit by exchanging connectors at J3 and J4 on test adapter. Ensure that test setup now conforms with figure 5-1.	
9.	Return power to test set, test adapter and switching unit in that order. Reload operational date in UUT in accordance with paragraph 1-9, steps a through c and j through o.	
10.	Set the switching unit M-P-G switch to MANUAL and the Frequency Selector switches to 300.000.	

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
11.	Set test adapter STD POWER CONTROL switch to BYPASS and SERIAL CONTROL switch to UUT.	
12.	Set the T-2-3-A switch to the A position.	Warning tone heard in headset connected to test set J1.
13.	Set the T-2-3-A switch to the 3 position.	Warning tone stops.
14.	Disconnect the reference unit from the 30 dB pad.	
15.	Start the TOD clock in the UUT by simultaneously holding the T-2-3-A switch in the T position and pressing the TONE switch for 1 second, make reading, then release both switches and return the T-2-3-A switch to the 3 position.	Test adapter current meter reading increases momentarily.
16.	Return test adapter SERIAL CONTROL switch to the BOTH position.	
17.	Reconnect the reference unit to the 30 dB pad.	
18.	Send TOD to the reference unit by pressing TONE switch.	TOD tone followed by clear tone (1020 Hz) heard in headset connected to J1 of test set.
19.	If step 5 was performed single WOD method, initialize WOD by cycling both radios to preset 20 through 15 by setting the M-P-G switch to PRESET and listening for a single beep on channels 20 through 16 and a double beep on channel 15; return M-P-G switch to MANUAL. If step 5 was performed MWOD method, proceed to next step.	
20.	Set T-2-3-A switch to the A position.	No warning tone in either headset.

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
	NOTE If testing AN/URC-98 or AN/URC-99 system disregard step 21 and proceed to step 22.	
21.	Set the 00/25/50/75 frequency switch to 75. Return 00/25/50/75 frequency switch to 00 after check is completed.	Pulsating warning tone (illegal net alarm) is heard in both headsets.
22.	Transmit voice from reference unit using headset-microphone connected to test adapter.	Voice intelligible on headset-microphone connected to test set.
23.	Transmit voice from UUT using headset-microphone connected to test set.	Voice intelligible on headset-microphone connected to test adapter.
24.	Turn the Function Selector to OFF. Set the Prime POWER IN switch on the test set to OFF. Set the test adapter POWER switch S1 to OFF for 30-45 seconds.	
25.	Set test adapter POWER switch S1 to ON, PRIME POWER IN switch on test set to ON, and Function Selector to MAIN.	Warning tone in reference and no warning in UUT.
26.	Turn Function Selector switch to OFF. Set the PRIME POWER IN switch on test set to OFF and set test adapter POWER switch S1 to OFF. On the UUT disconnect cable from J11 and J12 and remove the remote RT (refer to Section VIII for removal instructions). **CAUTION** Remove the Divider/Audio board slowly. The P2 to J2 connector will still be attached.	
27.	Pull Divider/Audio Board, A2, straight up and clear of guides, releasing card connector J1 from P5.	

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
28.	Use Digital Voltmeter to perform the following checks, referring to figure FO-1.	
	CONTINUITY CHECK	
	FROM / TO / KEEP ALIVE SWITCH S1 POSITION	
	J2-F / P5-G / ON	CONTINUITY
	J2-F / J12-a / ON	CONTINUITY
	J11-M / J11-L / ON	CONTINUITY
	J11-M / P5-V / ON	CONTINUITY
	J2-F / P5-G / OFF	OPEN (>100K ohms)
	J2-F / J12-a / OFF	OPEN (>100K ohms)
	J11-M / J11-L / OFF	OPEN (>100K ohms)
	FROM / TO / TOD SEND SWITCH S2 POSITION	
	J11-M / P5-V / OFF	OPEN (>100K ohms)
	J11-M / P6-5 / EITHER	CONTINUITY
	J2-G / J12-Y / EITHER	CONTINUITY
	J2-K / P5-I / EITHER	CONTINUITY
	P4-7 / J11-K / EITHER	CONTINUITY
	P4-3 / J11-N / EITHER	CONTINUITY
	P4-7 / P4-3 / OUT	OPEN (>100K ohms)
	P4-7 / P4-3 / IN	CONTINUITY
29.	Exchange the (UUT) remote RT with the reference unit RT. Reinstall the Divider/Audio board and reconnect the battery. Repeat steps 1 through 23.	Same as steps 1 through 23.
30.	Depress and hold the key switch of the headset adapter connected to the test set; then depress and hold the key switch of the headset adapter connected to the test adapter.	25 ±5 kHz signal on oscilloscope; 0.1Vp-p min, 0.4Vp-p typical.
31.	Release and rekey the UUT several times using the headset adapter connected to the test adapter. Release both key switches at completion of test.	25 kHz signal present each time both transmitters are keyed. Approximate 8 kHz tone audible in headset when UUT is keyed.

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
32.	Depress and hold the key switch of the headset adapter connected to the test adapter; then depress and hold the key switch of the headset adapter connected to the test set.	25 ±5 kHz signal on oscilloscope; 0.1Vp-p min, 0.4Vp-p typical.
33.	Release and rekey the reference unit several times using the headset adapter connected to the test set.	25 kHz signal present each time both transmitters are keyed. Approximate 8 kHz tone audible in headset connected to test set when reference unit is keyed.
34.	Turn the Function Selector to OFF. Set the PRIME POWER IN switch on the test set to OFF. Set the test adapter POWER switch S1 to OFF. Set MT-6165 mount KEEP-ALIVE ON/OFF switch to OFF.	
35.	Remove the remote RT unit from the UUT and exchange it with the remote RT in the reference unit position. The test of the MT-6165 mount is complete.	
	NOTE Perform the following procedures to test the C-10904 or the C-10905 control.	
	C-10904 AND C-10905 CONTROLS	
36.	Connect equipment as shown in figure 5-2 (for the C-10904 control) or figure 5-3 (for the C-10905 control).	
	NOTE Unless otherwise specified, all tests are to be conducted with the BW (bandwidth) switch in the WB (wideband) position.	
37.	On the MX-10246/ARM-173 Test Adapter (test adapter), set the following switches to the positions indicated.	

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure		Required indication
	Switch	Position	
	BTRY PWR - S2	OFF	
	TOD HARDWIRE - S3	OFF	
	NORM PWR - S4	ON	
	STD KEY ON - S5	OFF	
	RFO - S6	OPEN	
	SERIAL CONTROL - S7	UUT	
	TAKE CONTROL - S8	RT-1168A (URC-98/98A) or C-10832 (URC-99/99A)	
	STD POWER CONTROL - S9	OPEN	
	VOLUME CONTROL - S10	COMM	
	KEEP ALIVE - S11	OFF	
	TOD - S12	Either	
	POWER - S1	ON	
38.	On the J-3407/ARM-173 Interface Junction Box (test set), set the following switches to the positions indicated.		
	Switch	Position	
	X-MODE ENABLE	OFF	
	XMIT KEY	Mid (off)	
	TONE KEY	Mid (off)	
	PRESET READ	CHAN	
	TAKE CONTROL	CONT (URC-98/98A) or RT (URC-99/99A)	
	METER INPUT	CONT (to monitor current of control unit) RT (to monitor current of receiver-transmitter)	
	PRIME POWER ON/OFF	ON	
39.	Set switching unit controls to the following positions.		Indicator reads 20

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
	Switch / Position Function Selector / MAIN M-P-G (MANUAL-PRESET-GUARD) / PRESET Frequency Switches / 300.000 Preset Channel Selector / 20 VOL (volume) control / Midpoint SQUELCH switch / ON	
40.	Set test set PRESET READ switch to FREQ and observe WOD for presets 20 through 15 on the indicator. **NOTE** If WOD is not correct, load this WOD. Use the single WOD loading procedure given in paragraph 1-8.	Indicator reads WOD as follows: 20 : 300.050 19 : 376.000 18 : 359.100 17 : 314.300 16 : 297.600 15 : 287.400
41.	Set test set PRESET READ switch to CHAN. Set switching unit M-P-G switch to MANUAL and Manual Frequency switches to 300.000.	
42.	Set the T-2-3-A switch to the A position.	Warning tone heard in headset connected to test set J1.
43.	Set the T-2-3-A switch to the 3 position.	Warning tone stops.
44.	Start the TOD clock in the UUT by simultaneously holding the T-2-3-A switch in the T position and depressing the TONE switch for 1 second, make reading, then release both switches and return the T-2-3-A switch to the 3 position.	Test adapter current meter reading increases momentarily.
45.	Cycle Preset Channel Selector from 20 to preset 15 by setting the M-P-G switch to PRESET and listening for for the required indications when the Preset Channel Selector is switched; then set the M-P-G switch to MANUAL.	A single beep is heard when preset channels 20 through 16 are selected. A double beep is heard when channel 15 is selected.

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
46.	Set T-2-3-A switch to the A position.	No warning tone in present headset.
47.	On the test set, set the PRESET READ switch to the FREQ position.	
48.	Set the T-2-3-A switch to the 3 position.	
49.	*Set the switching unit Function switch to the ADF position.	Test set ADF ENABLE lamp on.
50.	On the switching unit, set the Function switch to the MAIN position, the M-P-G switch to the MANUAL position and the Frequency Selector switches to 200.000.	
51.	Rotate each of the five Frequency Selector switches on the switching unit through all positions and observe the ID-1961B or ID-1961C Frequency Channel Indicator and LED readout.	Indicator and LED readouts correspond to digits selected.
52.	On the switching unit, set the M-P-G switch to the PRESET position and the Preset Channel Selector switch to 1. Set test set PRESET READ switch to CHAN.	
53.	Rotate the Preset Channel Selector switch from 1 through 20 and observe the ID-1961B or ID-1961C Frequency Channel Indicator.	Indicator readout corresponds to channel selected.
54.	On the switching unit, set the M-P-G switch to the GUARD position and observe the ID-1961B or ID-1961C Frequency Channel Indicator.	Indicator should read G.
55.	*On the test set, connect a jumper wire between 28 VDC PRIME POWER IN terminals to the 28 VDC PANEL LAMP TEST (CONT) terminals.	Panel lamps illuminated. (Red Lamp Color)

*C-10904 control only.

Table 5-1. System Minimum Performance Test-Continued

Step	Procedure	Required indication
56.	**On C-10905 control place LIGHTS/TOD SEND switch to LIGHTS position.	Panel lamps illuminated. (Red Lamp Color)
57.	Place the switching unit Function Selector switch to the OFF position. Set the PRIME POWER IN switch on the test set to OFF. Set the test adapter POWER switch S1 to OFF.	
58.	**Disconnect cable to J1.	
59.	** Use Digital Voltmeter to perform the following checks, referring to figure FO-6. (NOTE: J1 reference see item 22 of figure 1-4. J3 reference see item 16 of figure 1-4).	
	FROM: J1-P / TO: J1-D / KEEP ALIVE SWITCH S16 POSITION: ON	CONTINUITY
	FROM: J1-G / TO: J1-H / KEEP ALIVE SWITCH S16 POSITION: ON	CONTINUITY
	FROM: J1-P / TO: J1-D / KEEP ALIVE SWITCH S16 POSITION: OFF	OPEN (>100K ohms)
	FROM: J1-G / TO: J1-H / KEEP ALIVE SWITCH S16 POSITION: OFF	OPEN (>100K ohms)
	FROM: J1-B / TO: J3-B / KEEP ALIVE SWITCH S16 POSITION: EITHER	CONTINUITY
	FROM: J1-C / TO: J3-F / KEEP ALIVE SWITCH S16 POSITION: EITHER	CONTINUITY
	FROM: J1-B / TO: J3-G / KEEP ALIVE SWITCH S16 POSITION: EITHER	CONTINUITY
	FROM: J1-I / TO: J1-J / LIGHTS/TOD SEND SWITCH S15 POSITION: CENTER	OPEN (>100K ohms)
	FROM: J1-I / TO: J1-J / LIGHTS/TOD SEND SWITCH S15 POSITION: DOWN	CONTINUITY
60.	Testing is complete. Remove power and disconnect all test equipment.	

**C-10905 control only.

SECTION VI

MAINTENANCE INSTRUCTIONS FOR RADIO SET CONTROL C-10904/URC-98

6-1. GENERAL. This section contains instructions for maintenance of the C-10904/URC-98 Radio Set Control (C-10904 control).

6-2. TROUBLE ANALYSIS. Trouble analysis procedures for the C-10904 control are provided in flow diagram format in figure FO-7. Figure 6-1, flex cable layout diagram; figure FO-3, SA-2323/URC-98 Switching Unit schematic diagram; and figure FO-4, CX-12999/ARC-164 Wiring Harness schematic diagram are aids for troubleshooting the radio set control.

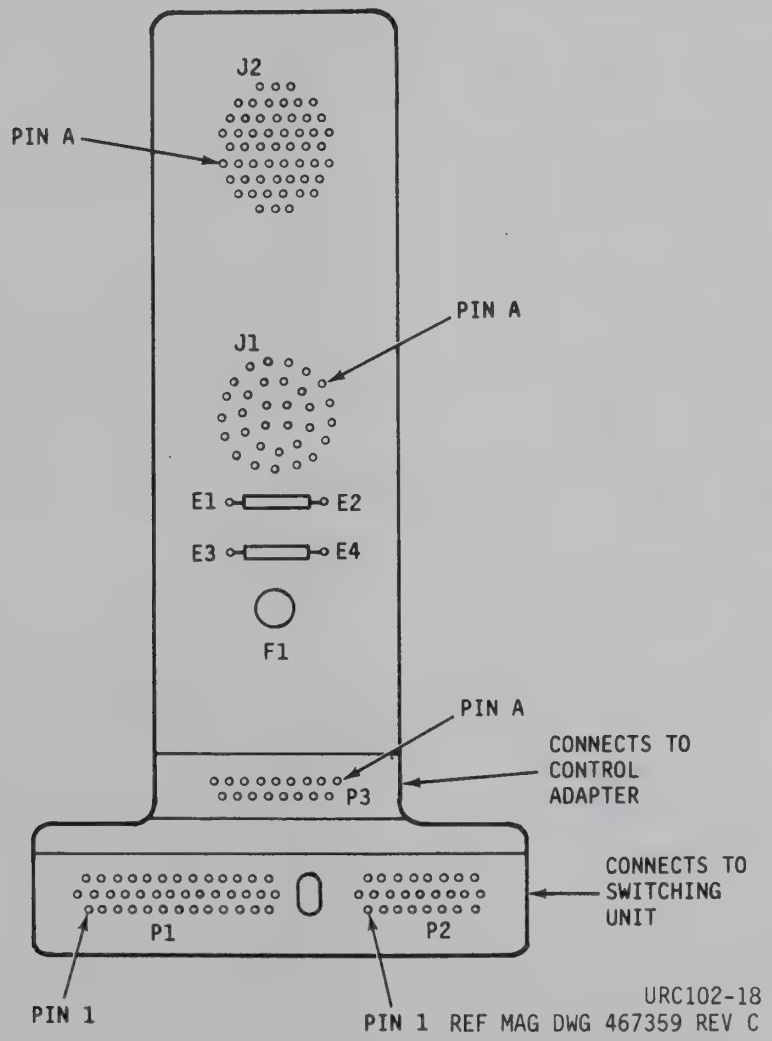


Figure 6-1. C-10904 Control Flex Cable Layout Diagram

6-3. PACKING INSTRUCTIONS. The following steps are packaging procedures for shipment to depot of any applicable items replaced during trouble analysis.

a. Retain the packaging material in which the spare was packed at the time of receipt, or replace with equivalent packaging material.

b. Using this packaging material, pack the item replaced according to the following information.

(1) For the switching unit assembly (A1), use figure 6-2.

NOTE

Remove memory subassembly (A1A1) from switching unit A1 before sending defective switching unit assembly to depot for repairs. Also, when sending a defective memory subassembly (A1A1) to depot for repairs, it should be removed from the switching unit (A1).

(2) For the control adapter (A2) and the memory subassembly (A1A1), use figure 6-3.

(3) For the flex cable, use figure 6-4.

CAUTION

The memory subassembly is subject to damage by static electricity. Observe precautions during maintenance, handling and shipment of electrostatic sensitive devices (ESD) in accordance with standard shop practices as outlined in TO 00-25-234.

6-4. REMOVAL AND REPLACEMENT. For removal of either of the two SRU's of the C-10905 control, perform the following procedures.

a. To remove the bottom cover plate, loosen the four cross-tip screws holding the plate.

b. Using a 5/32 hex socket-head wrench, loosen and remove the four (one in each rear corner) through-bolts which hold the SRU's together.

c. Loosen the six cross-tip screws on the rear and two cross-tip screws on the top of the unit to separate the rear cover plate from the control adapter SRU.

CAUTION

Use extreme caution when loosening and removing flex cable. See figure 6-5 for proper method of loosening and removing flex cable.

6-5. MEMORY SUBASSEMBLY REMOVAL. Removal and replacement of the memory subassembly consists of the following procedure.

CAUTION

When the memory subassembly is removed from the switching unit, care must be taken not to permit two spacers, which are located on the two studs toward the center of the switching unit, to become lost or interchanged during disassembly or reassembly of the unit. These spacers may be of different thicknesses and are installed to provide a stress free attachment of the memory to the switching unit. When the spacers are found to be loose, they should be cemented in place with a suitable adhesive such as MMM-A-1617 Type III or equivalent. When recementing, remove only one spacer at a time so that there is no possibility of putting the wrong spacer on the stud. If the spacers become lost or if their location is uncertain, the switching unit should be returned to the depot for regauging and proper installation of the correct spacers.

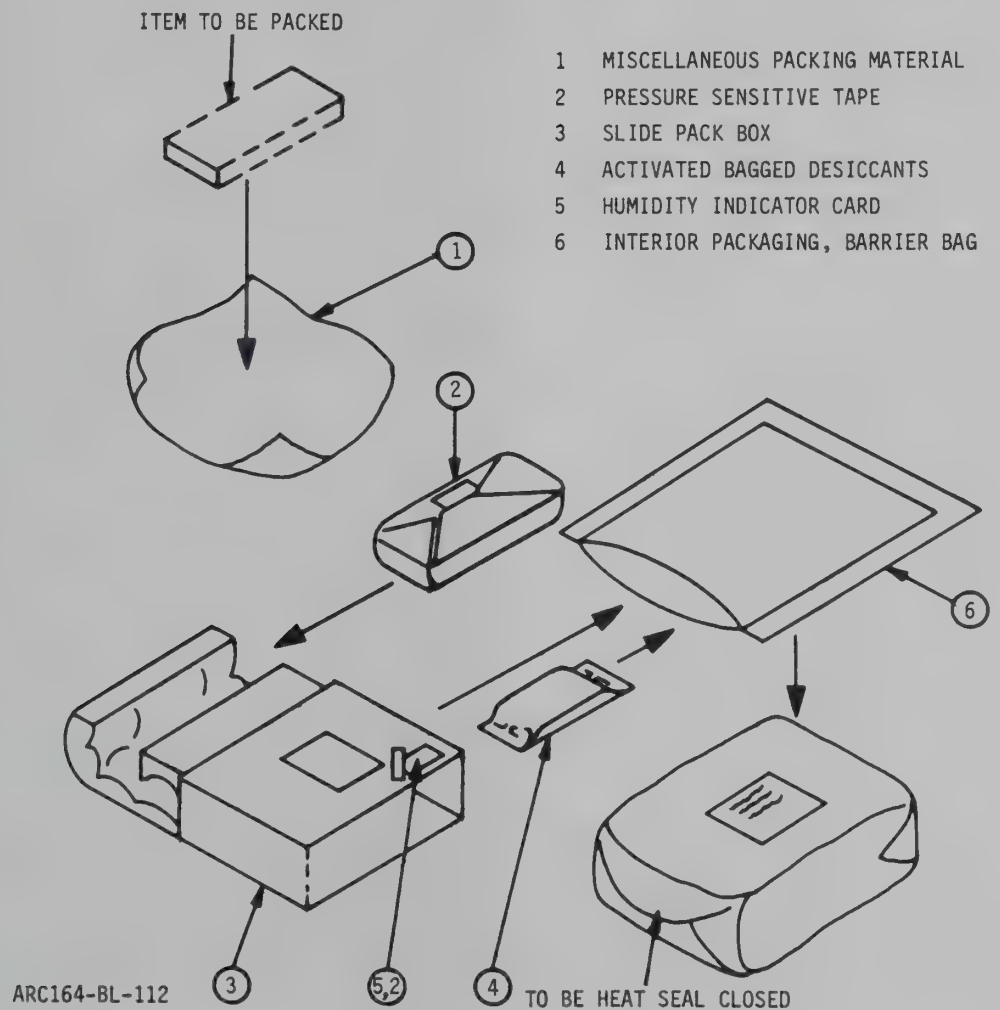


Figure 6-2. Switching Unit Assembly (A1) Packaging Diagram

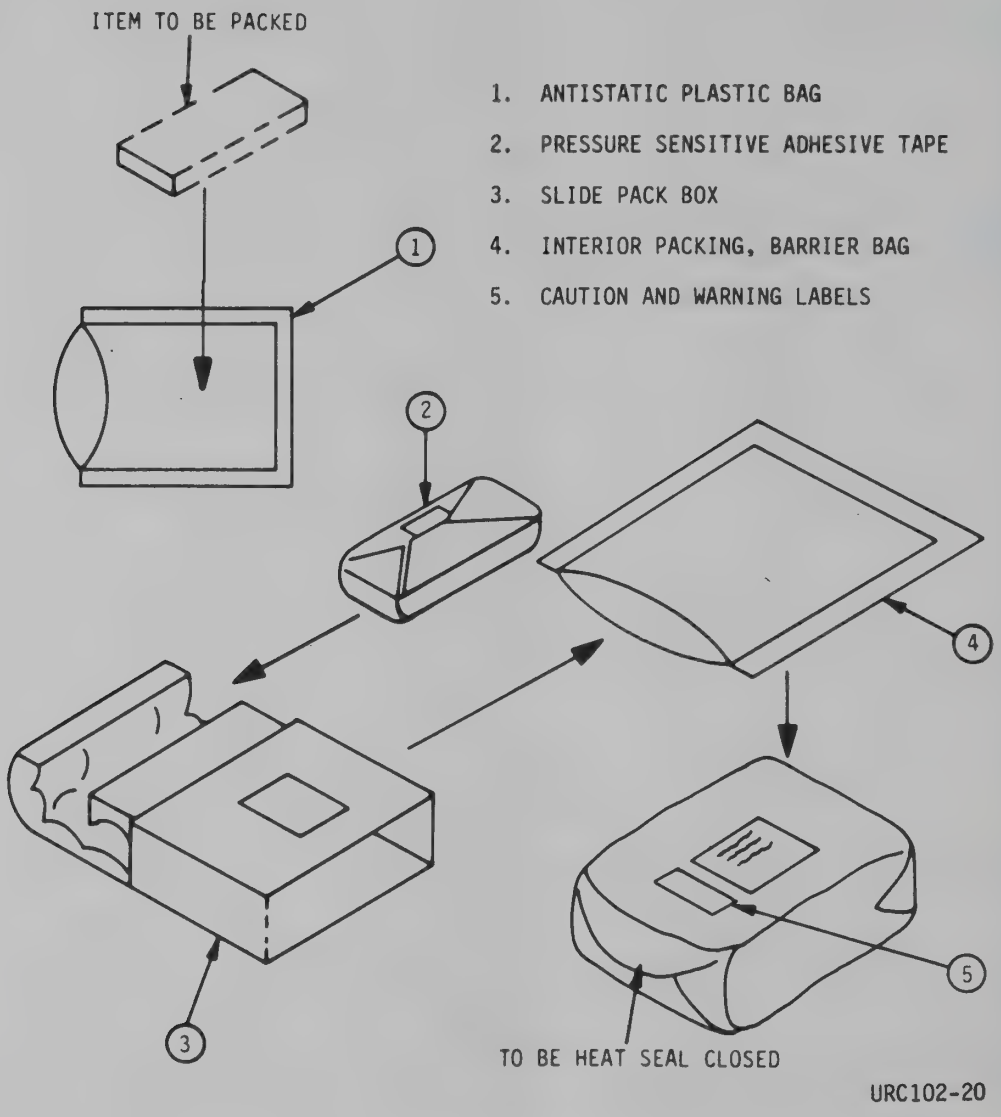


Figure 6-3. General Use Packaging Diagram

a. To remove the bottom cover plate, loosen the 12 cross-tip screws.

b. Using a small screwdriver, loosen and disconnect flex cable from connectors A1J1 and A1J3.

CAUTION

Use extreme caution when loosening and removing flex cable. See figure 6-5 for proper method of loosening and removing flex cable.

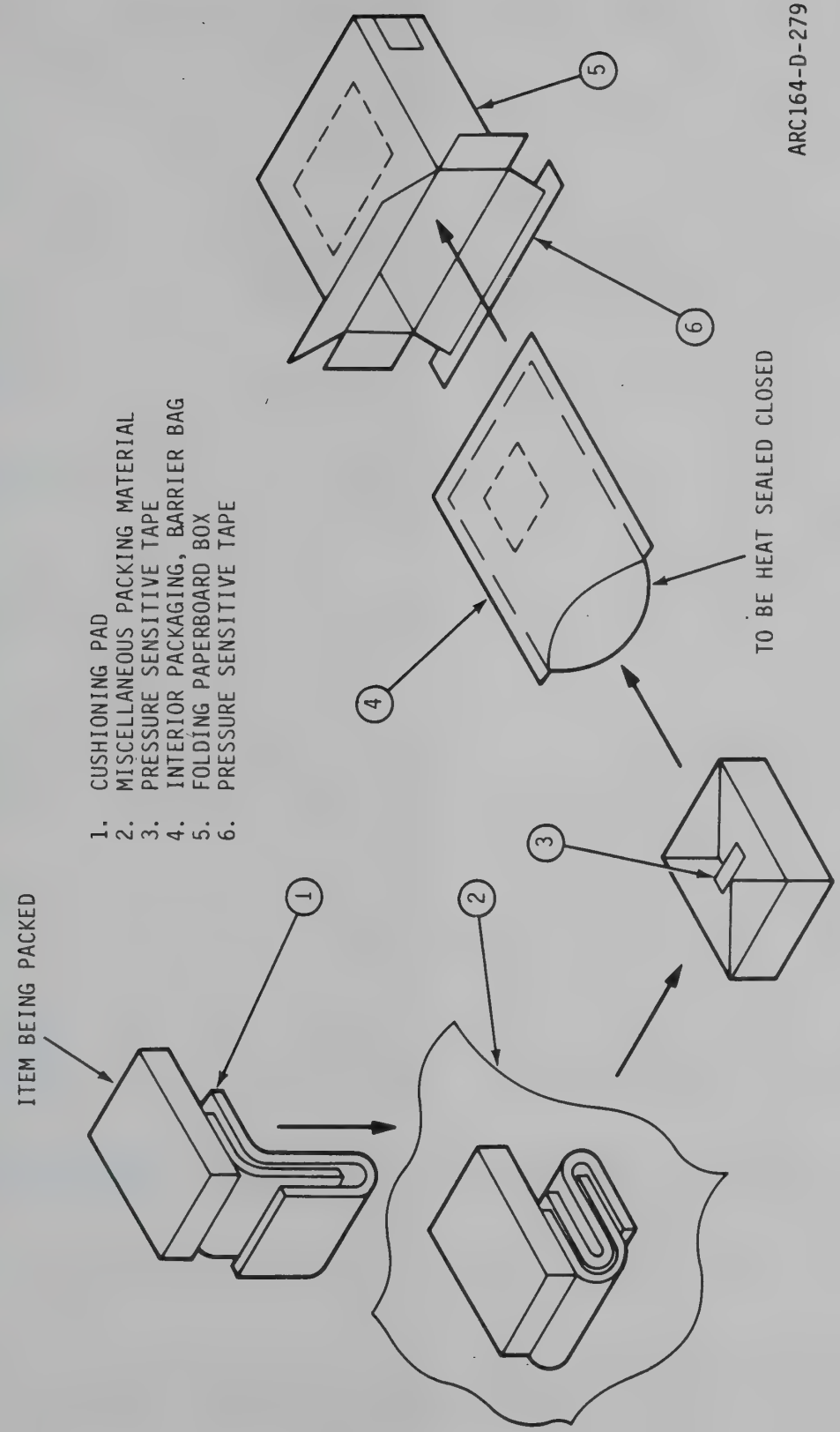


Figure 6-4. Radio Set Controls Packaging Diagram

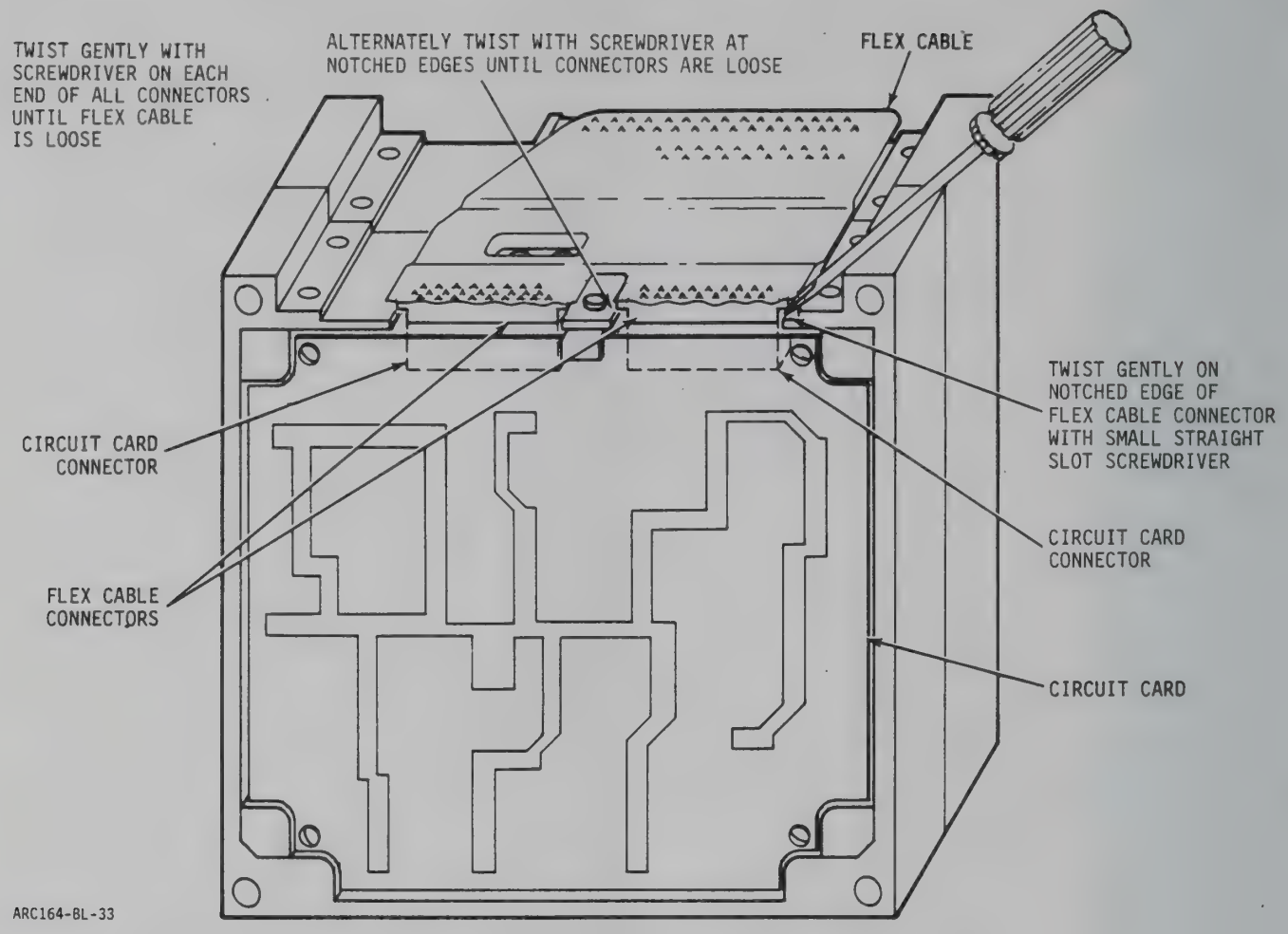

TWIST GENTLY WITH SCREWDRIVER ON EACH END OF ALL CONNECTORS UNTIL FLEX CABLE IS LOOSE
ALTERNATELY TWIST WITH SCREWDRIVER AT NOTCHED EDGES UNTIL CONNECTORS ARE LOOSE
FLEX CABLE
TWIST GENTLY ON NOTCHED EDGE OF FLEX CABLE CONNECTOR WITH SMALL STRAIGHT SLOT SCREWDRIVER
CIRCUIT CARD CONNECTOR
CIRCUIT CARD CONNECTOR
FLEX CABLE CONNECTORS
CIRCUIT CARD
ARC164-BL-33

Figure 6-5. Proper Method of Removing Flex Cable

c. Using a 5/32 hex socket head wrench, loosen and remove the four (one in each rear corner) through-bolts which hold the slices together.

d. Remove the switching unit assembly.

e. Remove the six screws (one in each corner, two in center) holding the memory subassembly to the SRU.

f. Use small screwdriver under connectors A1J1 and A1J3 to apply slight pressure to disconnect memory subassembly from mating connectors on switching unit assembly.

g. Replacement of the memory subassembly is the reverse of removal, making sure that mating connectors are properly seated before tightening attaching screws.

6-6. LIGHTING PANEL ASSEMBLY. To remove the lighting panel, remove the nine front panel knobs, the two screws holding the mask plate, and the dial assembly. The entire lighting panel can now be removed. Replacement is the reverse of removal.

SECTION VII

MAINTENANCE INSTRUCTIONS FOR RADIO SET CONTROL C-10905/URC-99

7-1. GENERAL. This section contains instructions for maintenance of the C-10905/URC-99 Radio Set Control (C-10905 control).

7-2. TROUBLE ANALYSIS. Trouble analysis procedures for the C-10905 control are provided in flow diagram format in figure FO-8. Figure FO-5, switching unit panel assembly C-10905/URC-99 schematic diagram and figure FO-6, C-10905/URC-99 wiring harness assembly, W1 interconnect diagram are aids for troubleshooting the C-10905 control.

7-3. PACKING INSTRUCTIONS. The following steps are packaging procedures for shipment to depot of any applicable items replaced during trouble analysis.

a. Retain the packaging material in which the spare was packed at the time of receipt, or replace with equivalent packaging material.

b. Using this packaging material, pack the item replaced according to the following information.

(1) For the Switching Unit panel assembly, use figure 6-2.

NOTE

Remove memory subassembly and power supply subassembly from chassis before sending defective switching unit panel assembly to depot for repairs. When sending a memory subassembly or power supply subassembly to depot for repairs, it should be removed from the chassis.

(2) For the memory subassembly, the wiring harness W1, and power supply subassembly, use figure 6-3.

CAUTION

The memory subassembly is subject to damage by static electricity. Observe precautions during maintenance, handling and shipment of electrostatic sensitive devices (ESD) in accordance with standard shop practices as outlined in TO 00-25-234.

7-4. REMOVAL AND REPLACEMENT. The following procedures detail the steps necessary to remove and replace subassemblies of the C-10905 control. Replacement is the reverse of removal. Refer to TO 12R2-2URC-104 for component attachment illustrations.

a. Wiring Harness W1.

(1) Remove the eight machine screws attaching the switching unit panel assembly to the rear housing assembly (housing).

(2) Carefully lift the panel assembly out of the housing to gain access to the connectors.

(3) Carefully disconnect P1 from the memory subassembly; P2 from the power supply circuit card assembly (power supply); and P3 from the panel assembly. Set the panel assembly aside.

(4) Remove the four machine screws attaching the wiring harness audio circuit card to the housing.

(5) Remove the lock nuts attaching connectors J1, J2, and J3 and switch S16 to the housing. Remove the wiring harness from the housing.

b. Power Supply A2.

(1) Perform steps 7-4a.(1) through 7-4a.(3).

(2) Remove 10 screws and washers attaching power supply to mounting plate; then remove power supply.

c. Memory Subassembly A1 or Switching Unit Panel Assembly A3.

(1) Perform steps 7-4b.(1) and 7-4b.(2).

(2) Remove four screws attaching mounting plate to frame. Remove mounting plate.

(3) Remove six screws attaching memory subassembly to frame and remove memory subassembly.

CAUTION

When the memory subassembly is removed from the switching unit, care must be taken not to permit two spacers, which are located on the two studs toward the center of the switching unit, to become lost or interchanged during disassembly or reassembly of the unit. These spacers may be of different thicknesses and are installed to provide a stress free attachment of the memory to the switching unit. When the spacers are found to be loose, they should be cemented in place with a suitable adhesive such as MMM-A-1617 Type III or equivalent. When recementing, remove only one spacer at a time so that there is no possibility of putting the wrong spacer on the stud. If the spacers become lost or if their location is uncertain, the switching unit should be returned to the depot for regauging and proper installation of the correct spacers.

SECTION VIII

MAINTENANCE INSTRUCTIONS FOR MT-6165/URC ELECTRICAL EQUIPMENT MOUNTING BASE

8-1. GENERAL. This section contains instructions for maintenance of the MT-6165/-URC Electrical Equipment Mounting Base (MT-6165 mount).

NOTE

Calibration of oscillator A1A1Y1 is required every 5 years, whenever the frequency is found to be out of tolerance, or whenever the radio frequency oscillator is returned for a frequency malfunction. Calibration of the oscillator will be performed by PMEL using the MX-10247/ARM-175 Test Adaptor (part of TS-3919/ARM-173 Radio Test Set). Set oscillator frequency to ± 1 part in 10^{10} after 1 hour warmup. Use calibration methods described in TO 33K3-4-1-22, Section 2133.

8-2. TROUBLE ANALYSIS. Trouble analysis procedures for the MT-6165 mount are provided in flow diagram format in figure FO-9. Trouble analysis of the AN/ARC-164(V) remote RT (mounted in, but not part of the MT-6165 mount) is provided in TO 12R2-2ARC164-32. Figure FO-1 is a schematic diagram of the MT-6165 mount.

CAUTION

The divider/audio board, A2 is subject to damage by static electricity. Observe precautions during maintenance, handling and shipment of electrostatic sensitive devices (ESD) in accordance with standard shop practices as outlined in TO 00-25-234.

8-3. PACKING INSTRUCTIONS. The following steps are packaging procedures for shipment to depot of any applicable items replaced during trouble analysis.

a. Retain the packaging material in which the spare was packed at the time of receipt, or replace with equivalent packaging material.

b. Using this packaging material, pack the item replaced according to the following information.

(1) To pack the MT-6165 mount, use figure 8-1.

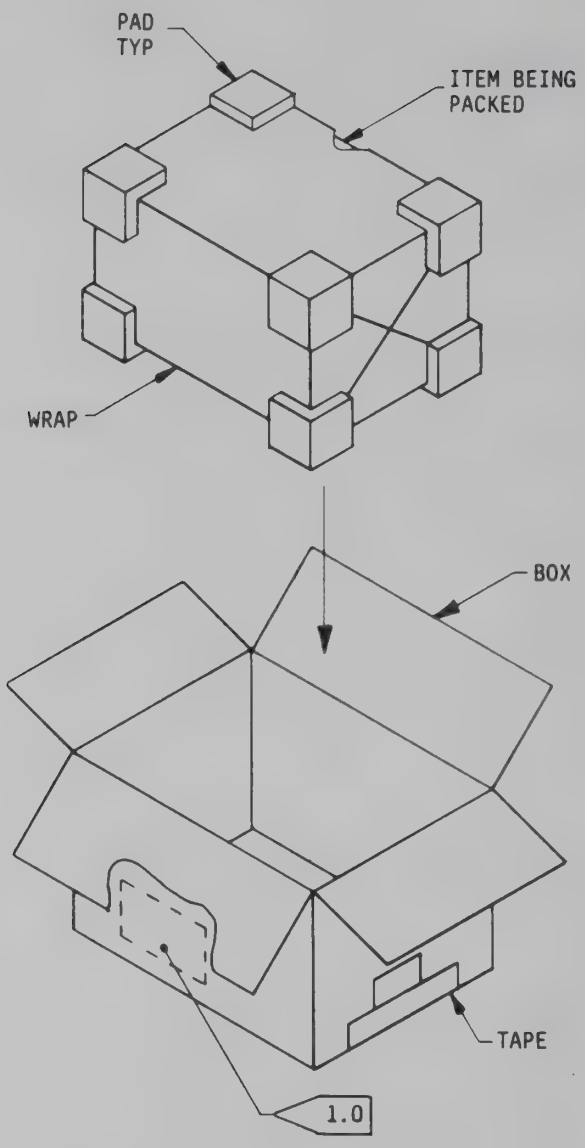
NOTE

Remove RT; oscillator, Y1; divider/audio board, A2; power supply, PS1; DC/DC converter, PS2; and battery, BT1 before sending a defective MT-6165 mount to depot.

(2) To pack the oscillator, Y1, use figure 8-2.

(3) To pack the divider/audio board, A2, use figure 8-3.

(4) To pack the power supply, use figure 6-3.

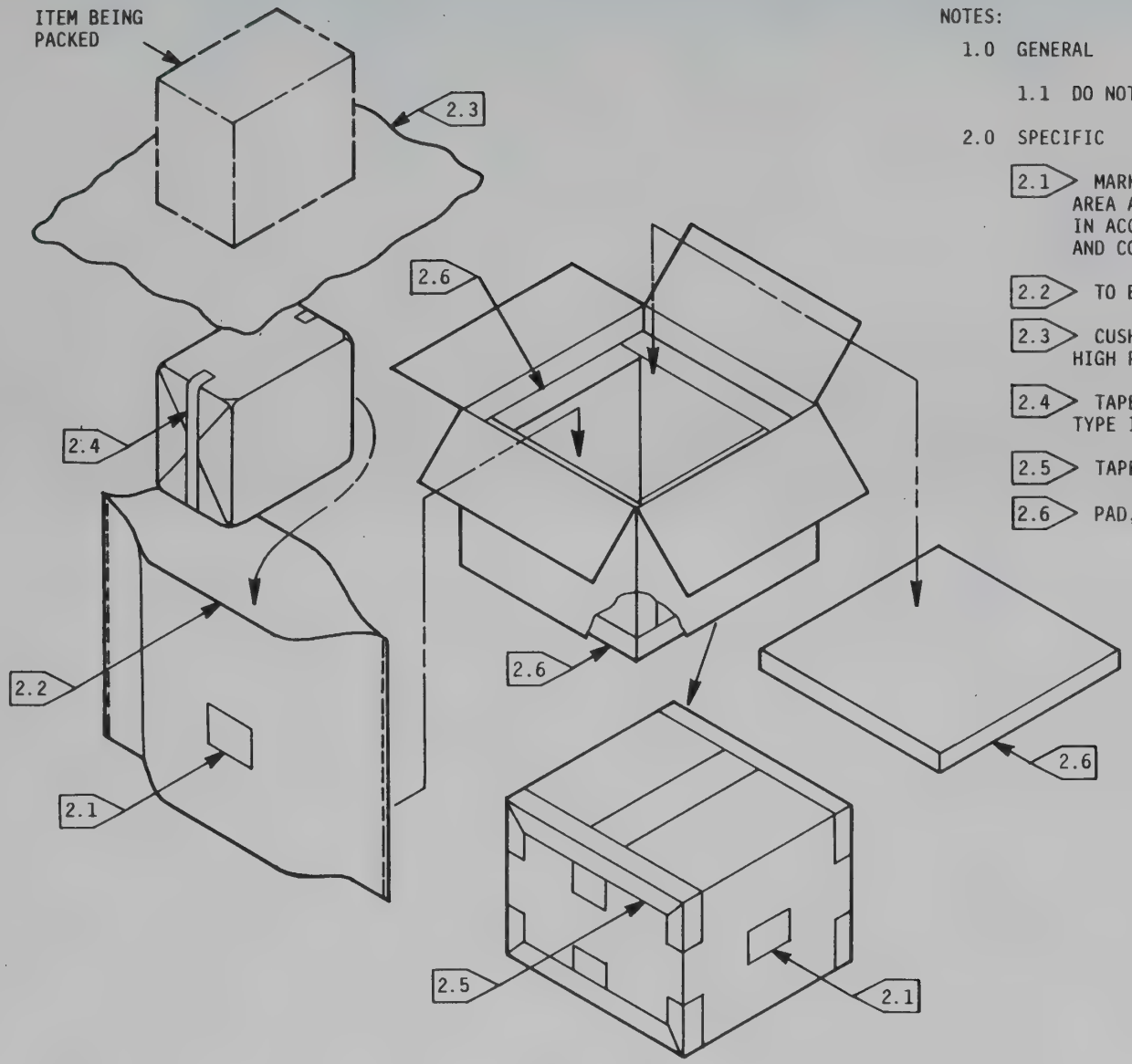


NOTE

1.0 MARKING TO BE APPLIED IN ACCORDANCE WITH MIL-STD-129 AND CONTRACTUAL REQUIREMENTS.

URC102-30
REF MX DWG NO. 788473

Figure 8-1. MT-6165 Mount Packaging Diagram



NOTES:

1.0 GENERAL

1.1 DO NOT SCALE DRAWING.

2.0 SPECIFIC

2.1 MARKING TO BE APPLIED IN AREA APPROXIMATELY AS SHOWN IN ACCORDANCE WITH MIL-STD-129 AND CONTRACTUAL REQUIREMENTS.

2.2 TO BE HEAT SEAL CLOSED.

2.3 CUSHIONING MATERIAL TO BE .19 HIGH PER PPP-C-795, TYPE II, BUBBLE.

2.4 TAPE TO BE .50 WIDE PER PPP-T-60, TYPE III, CLASS 2.

2.5 TAPE TO BE 2.00 WIDE PER PPP-T-76.

2.6 PAD, CUSHIONING

URC102-31
REF MX DWG NO. 535216

Figure 8-2. Oscillator Packaging Diagram

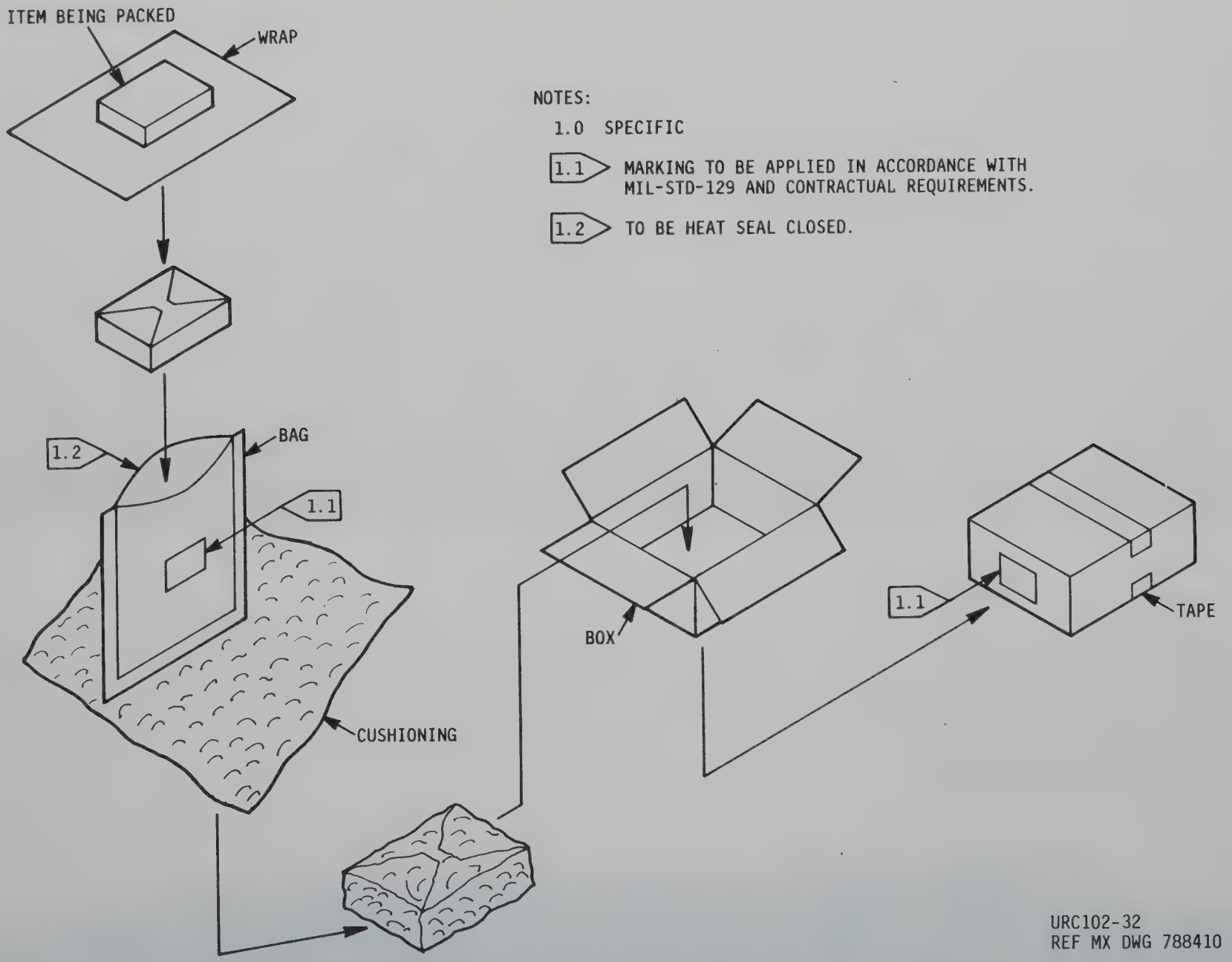


Figure 8-3. Divider/Audio Board Packaging Diagram

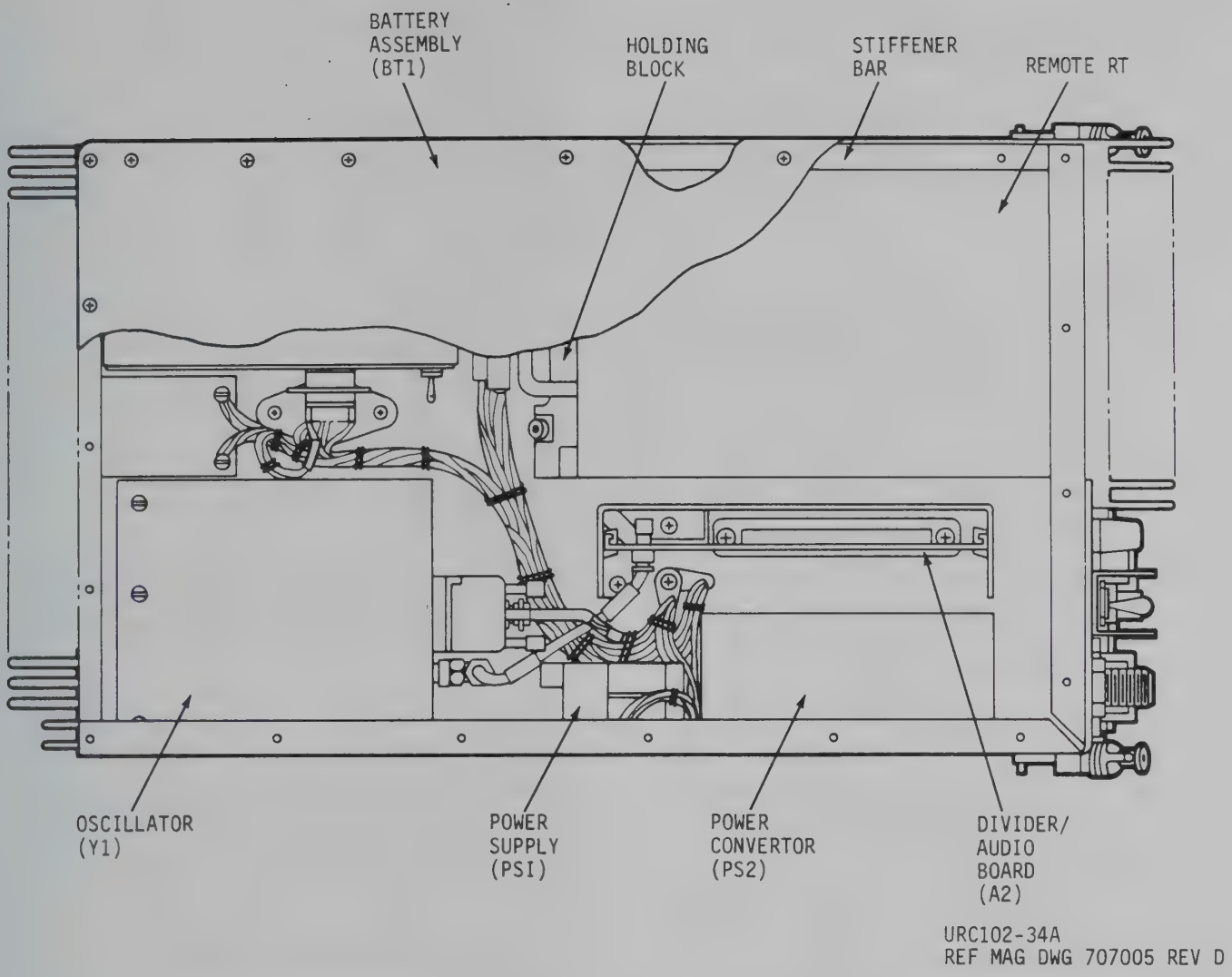


Figure 8-4. MT-6165 Mount Subassembly Locations Diagram

8-4. REMOVAL AND REPLACEMENT. To remove subassemblies of the MT-6165 mount, proceed as follows. Figure 8-4 is a subassembly location diagram. Replacement is the reverse of removal.

NOTE

Perform alignment of a new remote RT prior to replacement (refer to Section V).

a. General. Remove the top cover by removing the 19 cross-tip screws from the top of the mount.

b. Battery, BT1.

(1) Remove MT-6165 mount cover (paragraph 8-4a.).

(2) Remove four screws from side of case securing stiffener bar and remove stiffener bar (figure 8-4).

(3) Set KEEP ALIVE ON/OFF switch S1 to OFF.

(4) Disconnect P6 from battery connector J1.

WARNING

Each cell of the battery pack is equipped with a rubber plug to release any over-pressure of hydrogen gas caused by charging. Should an over-pressure occur, leaking of acid is possible. Prior to removal of the battery pack, inspect for cracks or breaks in the case and evidence of leakage. Should signs of leakage or corrosion be found, protective rubber gloves must be worn when removing the battery pack.

(5) Remove four cross-tip screws securing battery to side of the MT-6165 mount.

(6) Release four cross-tip screws securing L1 to rear of the mount. Loosen L1, then remove battery.

c. Receiver-Transmitter.

NOTE

For installation of a new remote RT, remove cover plate over J4 (if installed) then remove four round-head screws from corners of flex cable bracket (J4 mounting) before installing RT.

(1) Remove Battery, BT1 (paragraph 8-4b.).

(2) Release four captive mounting screws in heat sink (see figure 8-5).

(3) On RT, disconnect P2 from J2 and P1 from J1.

(4) Remove holding block by releasing two hex-head socket screws (see figure 8-4).

(5) Pull RT straight back in MT-6165 mount to disconnect P4 from J4, then remove RT.

d. Divider/Audio Board, A2.

(1) Remove MT-6165 mount cover (paragraph 8-4a.)

(2) Pull card A2 straight up and clear of guides, releasing card connector J1 from P5.

(3) Disconnect coax connector P2 from A2J2.

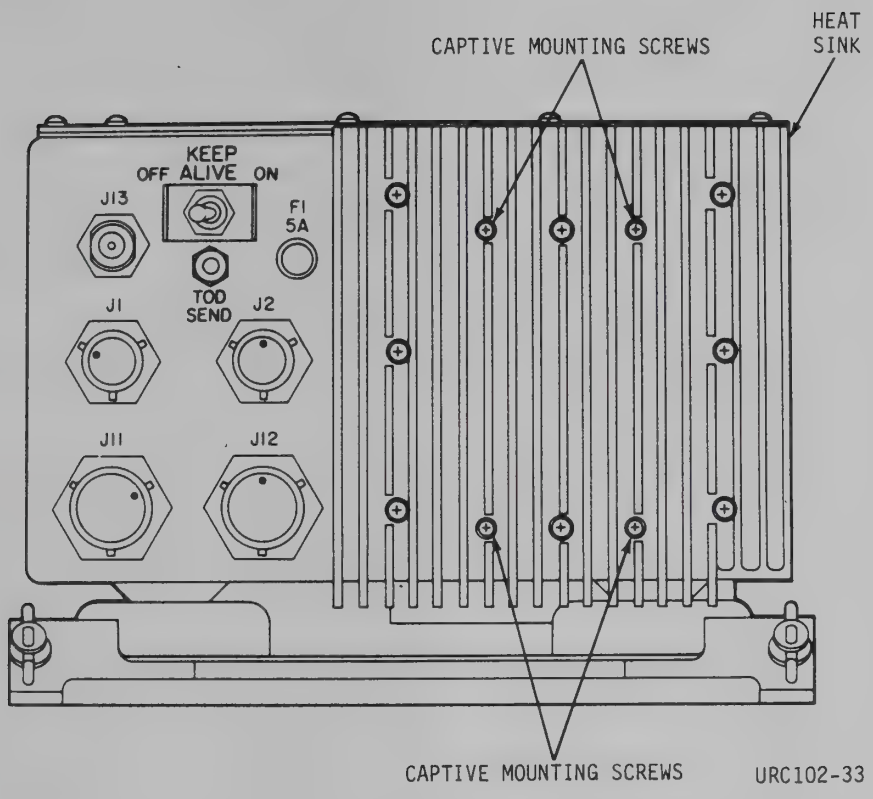


Figure 8-5. MT-6165 Mount (RT Removal)

e. Oscillator, Y1.

(1) Remove MT-6165 mount cover (paragraph 8-4a.).

(2) Disconnect coax connector P1 from oscillator jack J1 and plug P3 from oscillator jack J2.

(3) Remove eight cross-tip screws securing oscillator from rear of MT-6165 mount, then remove oscillator.

f. Power Supply, PS1.

(1) Remove MT-6165 mount cover (paragraph 8-4a.).

(2) Remove four cross-tip screws securing PS1 to the MT-6165 mount and remove PS1.

g. DC/DC Converter, PS2.

(1) Remove MT-6165 mount cover (paragraph 8-4a.).

(2) Remove four cross-tip screws securing PS2 to the MT-6165 mount side.

(3) Tag and unsolder four wires from sense and output terminals on one side of converter and two wires from input terminals on opposite side, then remove DC/DC converter.

SECTION IX

FOLDOUT ILLUSTRATIONS

9-1. GENERAL. This section contains foldout illustrations referenced throughout the manual. Table 9-1 lists the foldout illustrations.

Table 9-1. Foldout Illustrations Index

Figure number	Title	Page no.
FO-1	MT-6165 Mount Schematic Diagram	FO-1
FO-2	Switching Unit Assembly Block Diagram	FO-3
FO-3	Frequency Channel Switching Unit SA-2323/URC-98 Schematic Diagram	FO-5
FO-4	CX-12999/ARC-164 Wiring Harness Schematic Diagram	FO-9
FO-5	Switching Unit Panel Assembly C-10905/URC-99 Schematic Diagram	FO-11
FO-6	C-10905/URC-99 Wiring Harness Assembly W1 Interconnect Diagram	FO-15
FO-7	Radio Set Control C-10904/URC-98 Trouble Analysis	FO-17
FO-8	Radio Set Control C-10905/URC-99 Trouble Analysis	FO-23
FO-9	MT-6165 Mount Trouble Analysis	FO-29

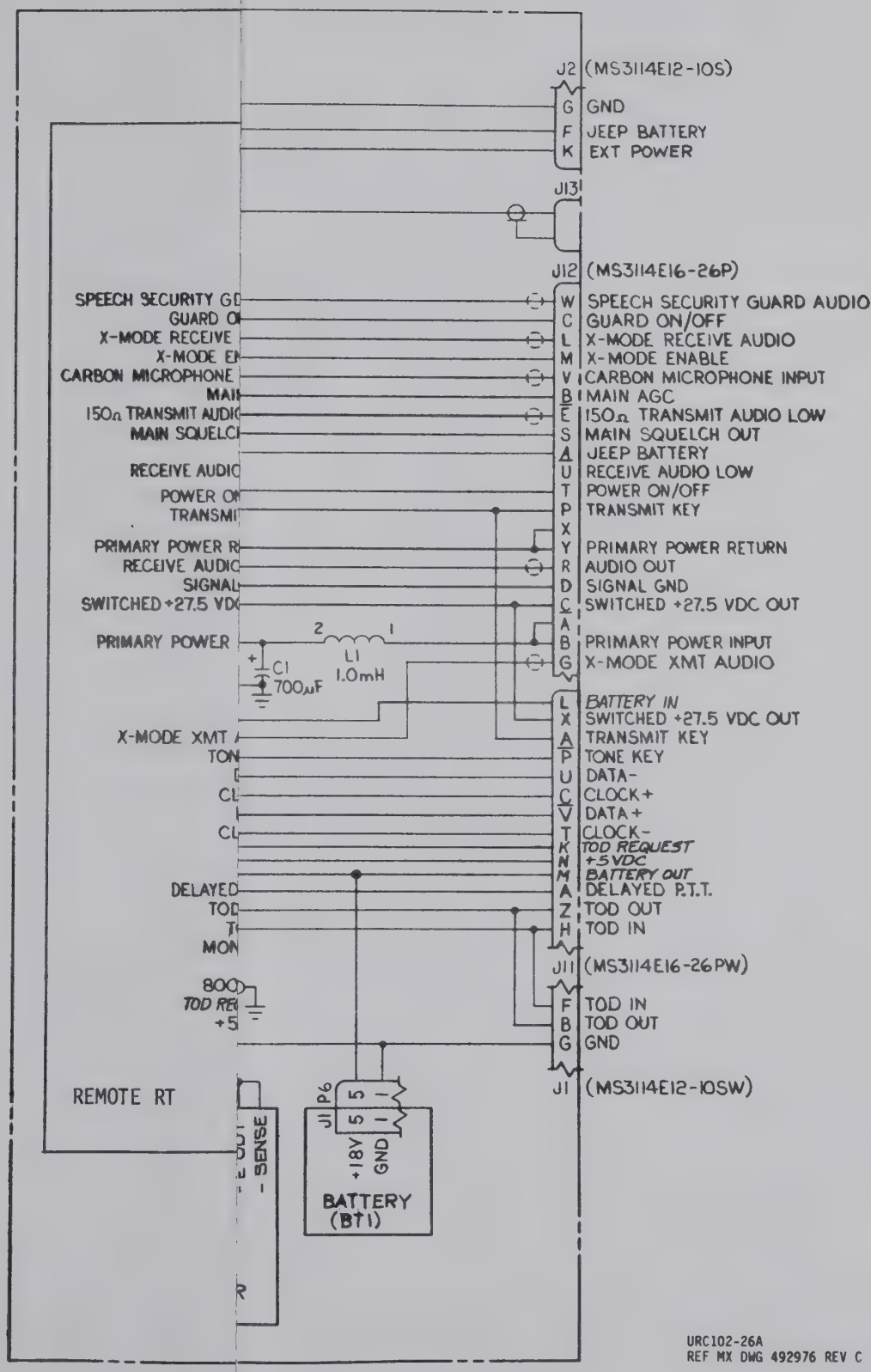


Figure FO-1. MT-6165 Mount
Schematic Diagram

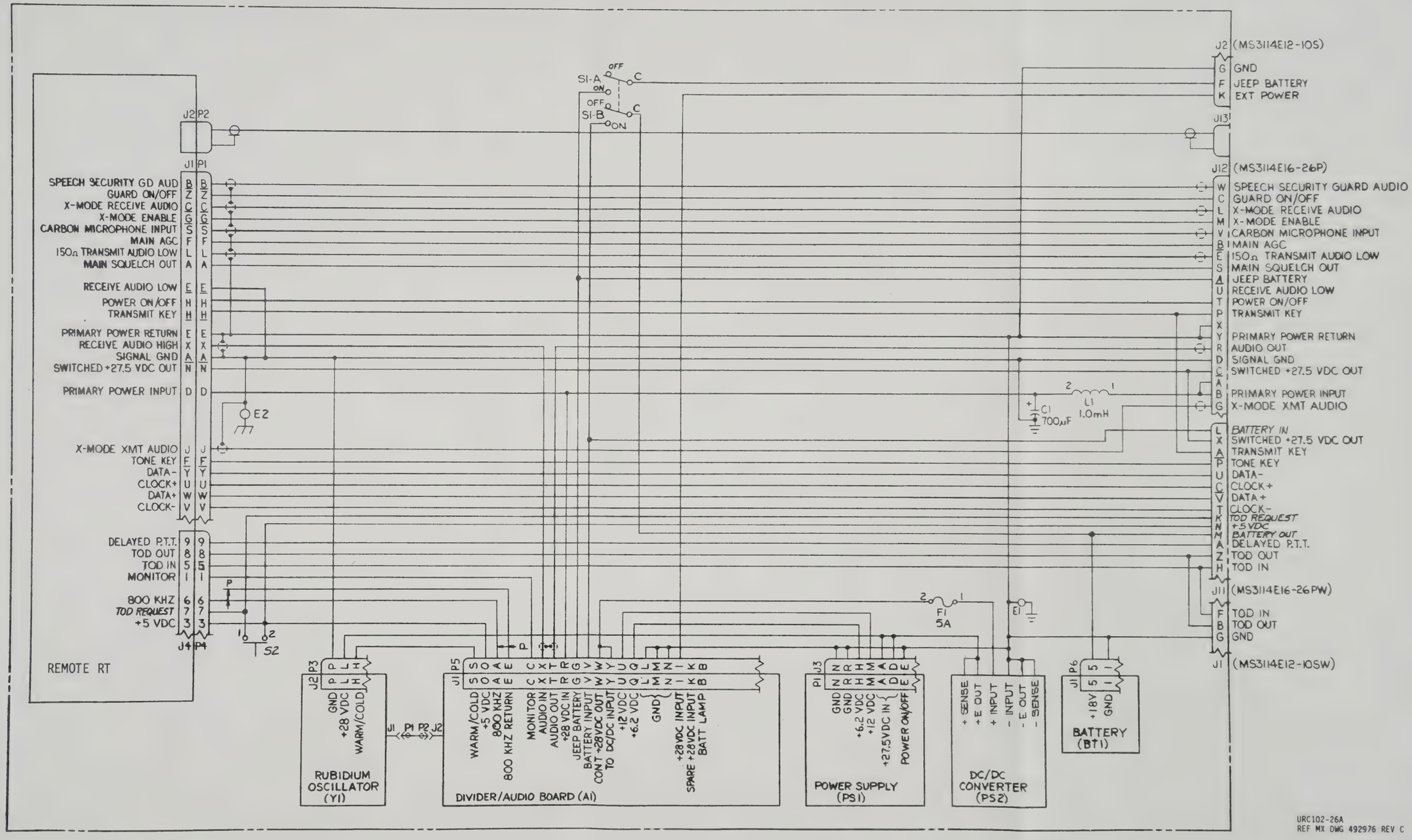


Figure FO-1. MT-6165 Mount
Schematic Diagram

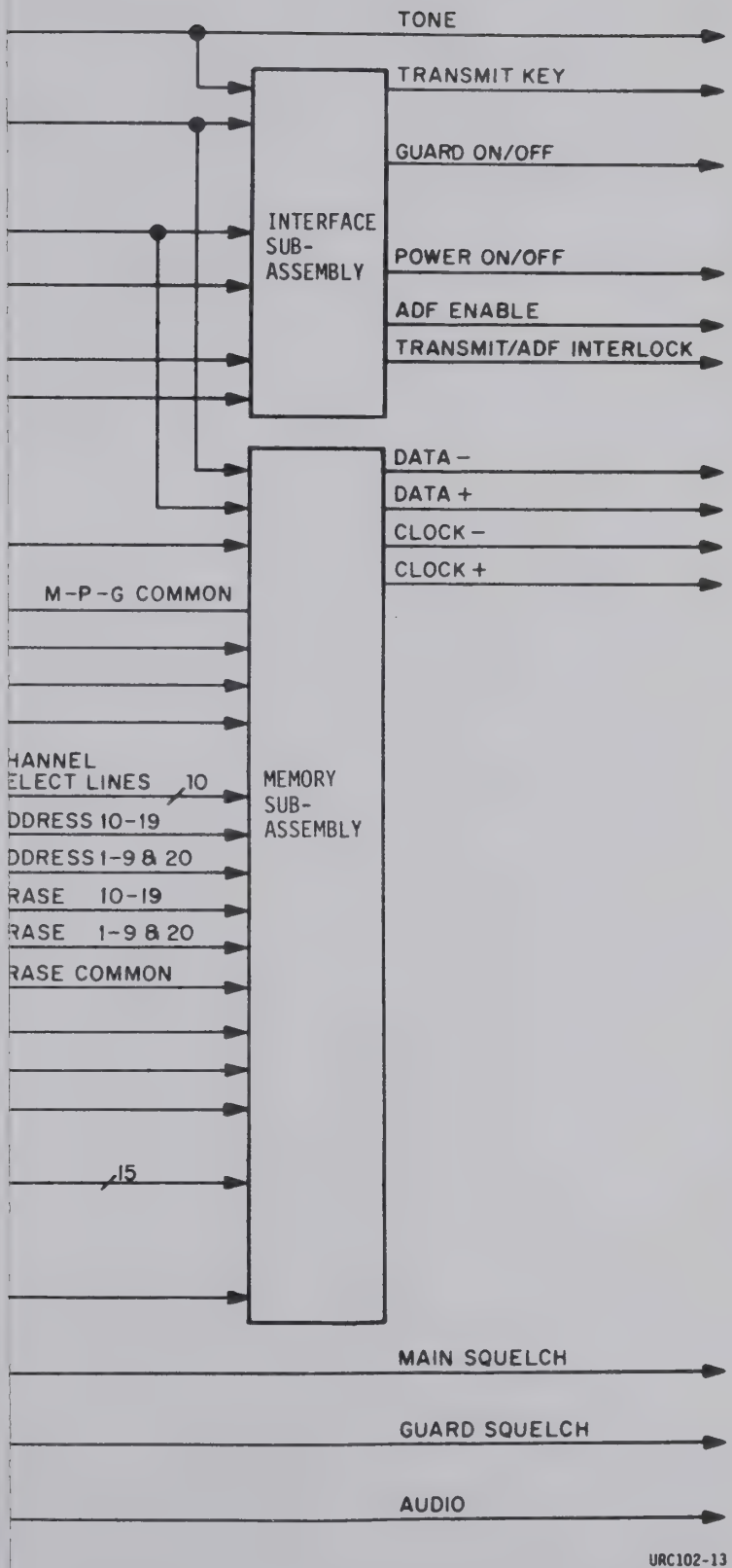


Figure FO-2. Switching Unit Assembly Block Diagram

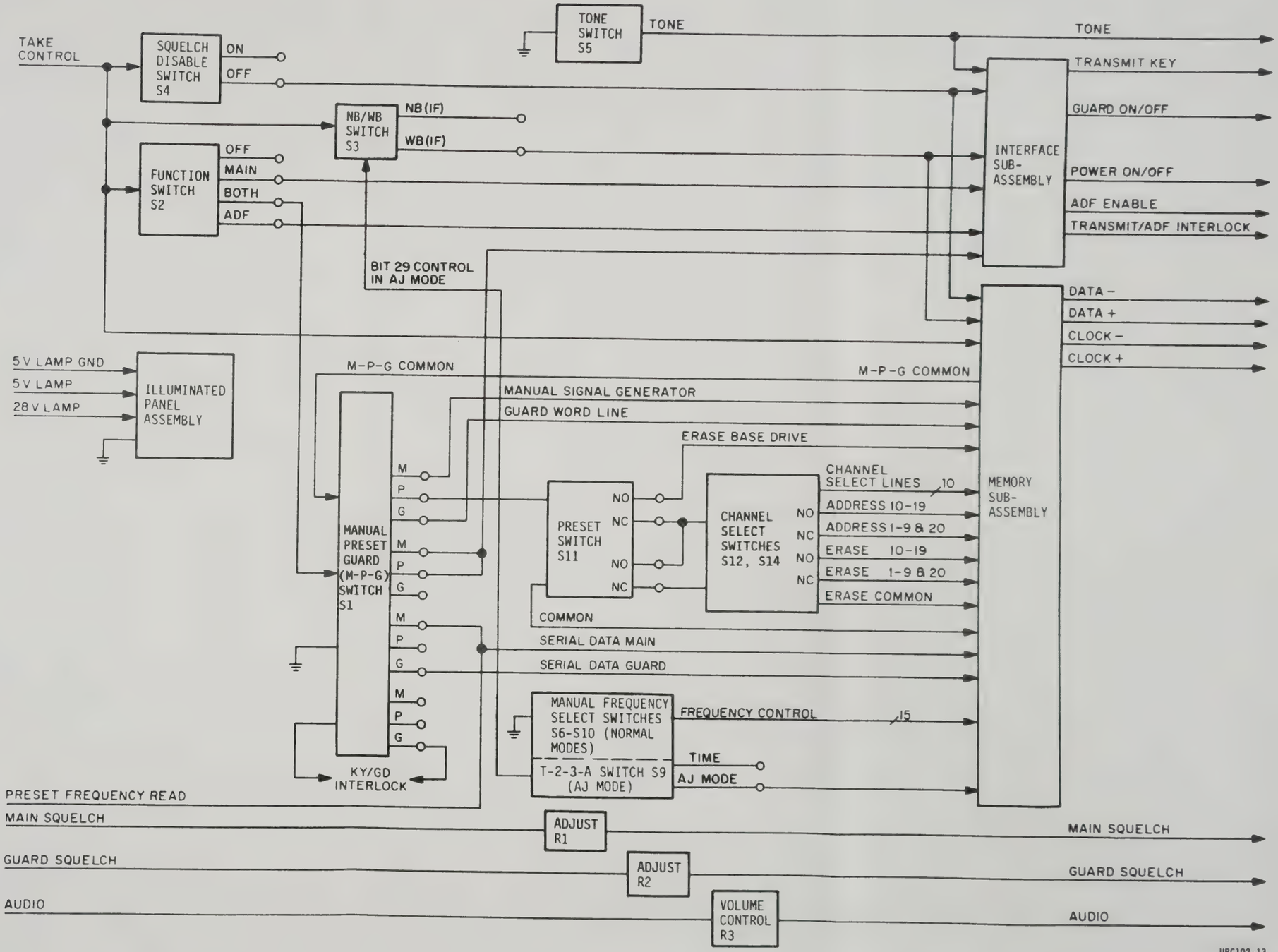


Figure FO-2. Switching Unit Assembly Block Diagram

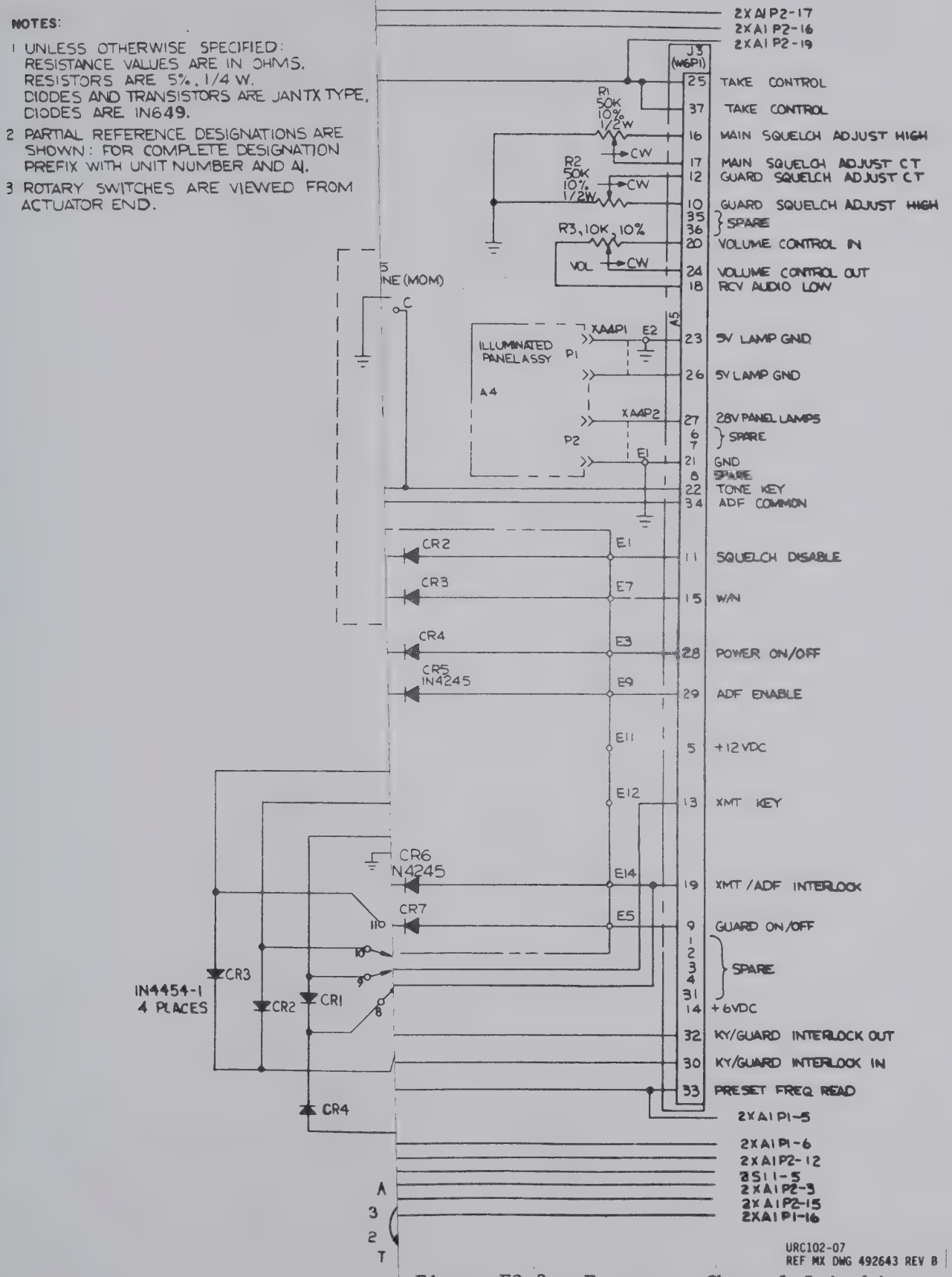
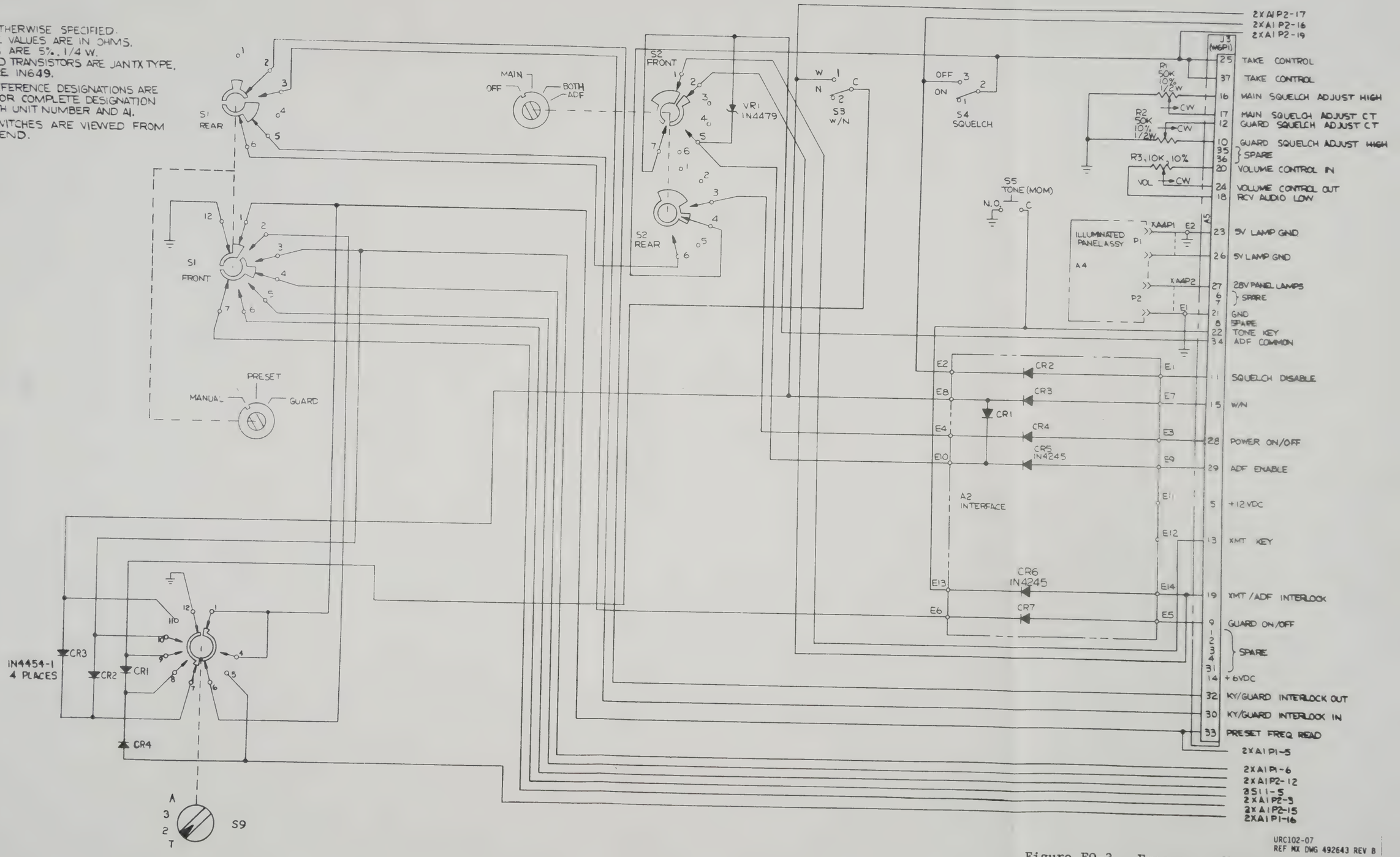


Figure FO-3. Frequency Channel Switching Unit SA-2323/URC-98 Schematic Diagram (Sheet 1 of 2)

NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS. RESISTORS ARE 5%, 1/4 W. DIODES AND TRANSISTORS ARE JANTX TYPE. DIODES ARE IN649.
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND A1.
3. ROTARY SWITCHES ARE VIEWED FROM ACTUATOR END.



URC102-07
REF MX DWG 492643 REV B

Figure FO-3. Frequency Channel Switching Unit SA-2323/URC-98 Schematic Diagram (Sheet 1 of 2)

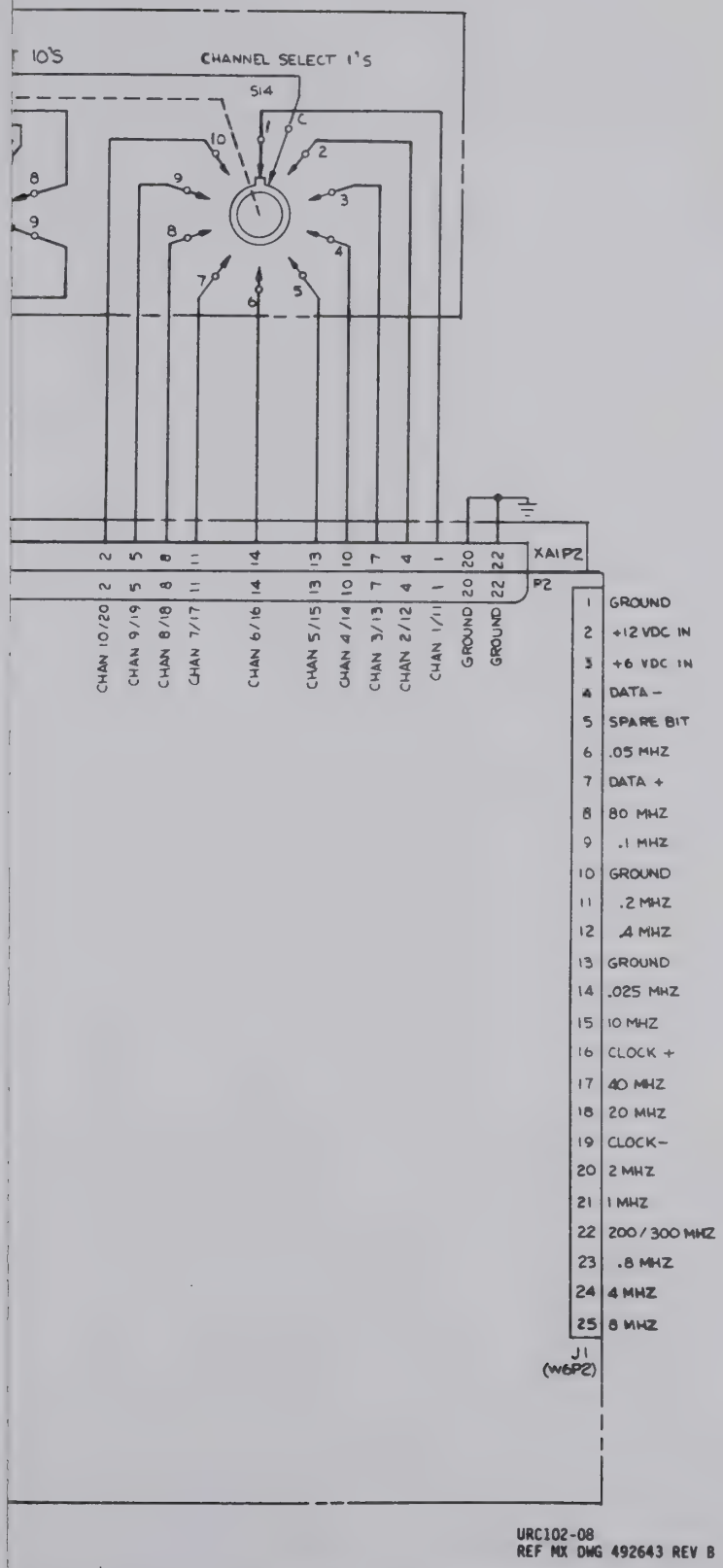


Figure FO-3. Frequency Channel Switching Unit SA-2323/URC-98 Schematic Diagram (Sheet 2 of 2)

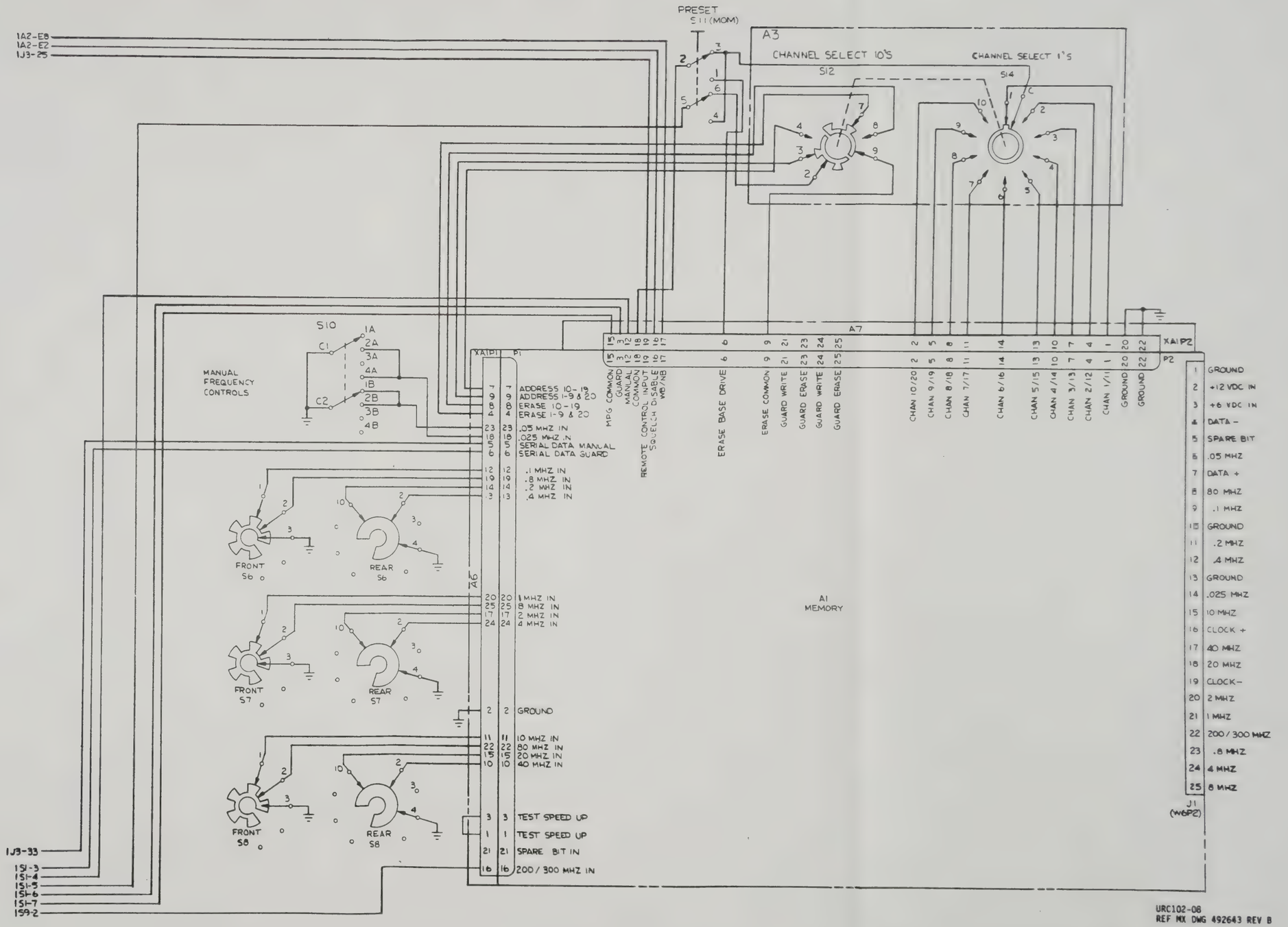


Figure FO-3. Frequency Channel Switching Unit SA-2323/URC-98 Schematic Diagram (Sheet 2 of 2)

NOTES:

1.0 GENERAL

1.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-100.

1.2 DATA IS APPLICABLE TO MAGNAVOX AND THEIR VENDORS ONLY AND IS NOT CONTRACTUALLY BINDING ON OTHER CONTRACTORS OR THE GOVERNMENT.

1.3 DATA INCLUDED IN PARENTHESIS, ( ), IS FOR REFERENCE ONLY.

1.4 UNLESS OTHERWISE SPECIFIED, DIMENSIONS, TOLERANCES, AND SURFACE FINISHES APPLY AFTER PLATING OR CHEMICAL FILM TREATMENTS, AND PRIOR TO ORGANIC COATINGS.

1.5 DO NOT SCALE DRAWING.

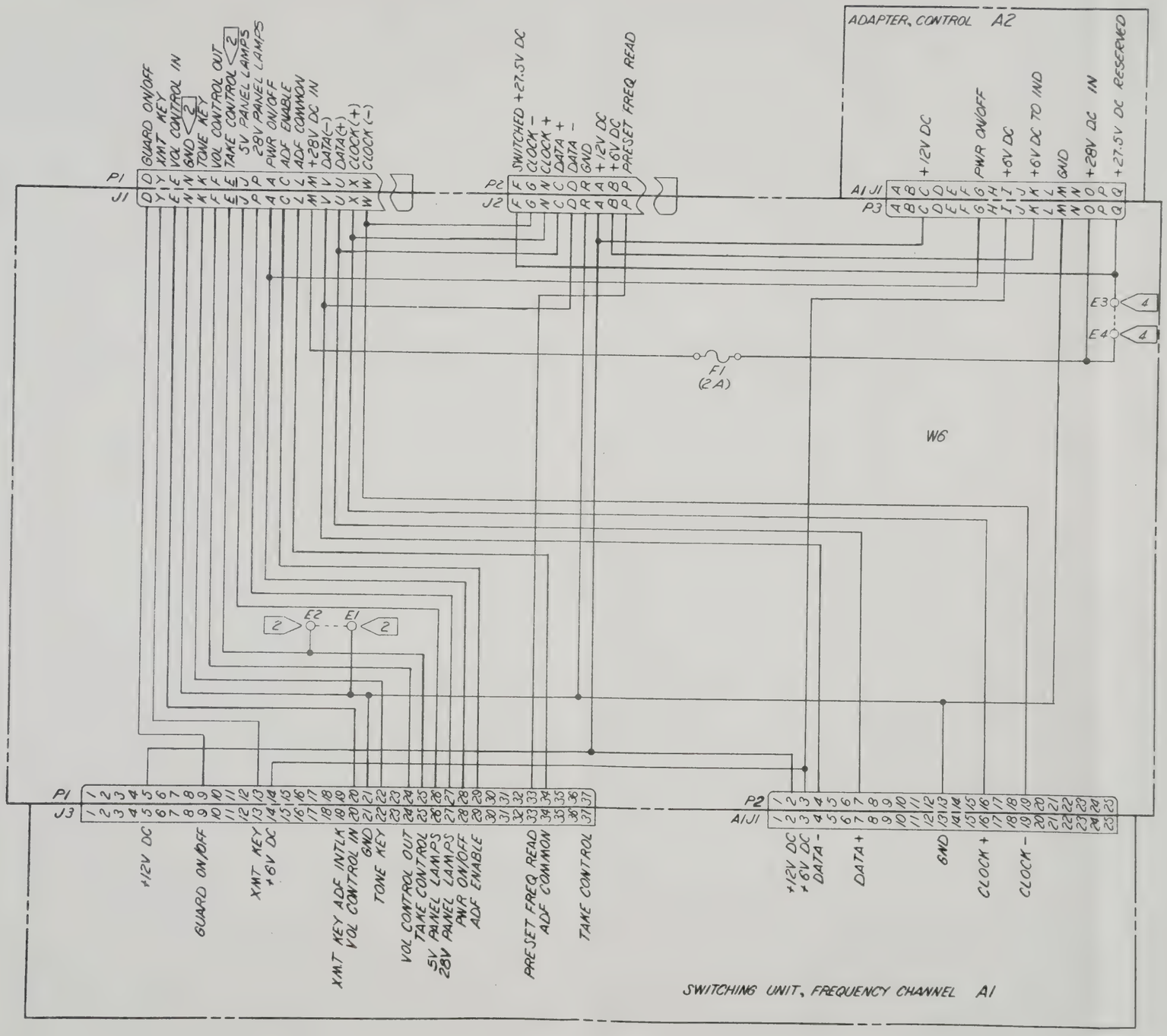
2 REMOVE JUMPER WIRE BETWEEN E1 AND E2 FOR EXTERNAL TAKE CONTROL.

3. CHARACTERS UNDERLINED DENOTES LOWER CASE.

4 JUMPER WIRE CONNECTS E3 AND E4 TO PROVIDE SWITCHED +28 VDC TO SPECIAL INDICATOR.

ARC164-8L-54
REF MX DWG 490977 REV A

Figure FO-4. CX-12999/ARC-164 Wiring Harness Schematic Diagram



NOTES:

1.0 GENERAL

1.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-100.

1.2 DATA IS APPLICABLE TO MAGNAVOX AND THEIR VENDORS ONLY AND IS NOT CONTRACTUALLY BINDING ON OTHER CONTRACTORS OR THE GOVERNMENT.

1.3 DATA INCLUDED IN PARENTHESIS, ( ), IS FOR REFERENCE ONLY.

1.4 UNLESS OTHERWISE SPECIFIED, DIMENSIONS, TOLERANCES, AND SURFACE FINISHES APPLY AFTER PLATING OR CHEMICAL FILM TREATMENTS, AND PRIOR TO ORGANIC COATINGS.

1.5 DO NOT SCALE DRAWING.

2. REMOVE JUMPER WIRE BETWEEN E1 AND E2 FOR EXTERNAL TAKE CONTROL.

3. CHARACTERS UNDERLINED DENOTES LOWER CASE.

4. JUMPER WIRE CONNECTS E3 AND E4 TO PROVIDE SWITCHED +28 VDC TO SPECIAL INDICATOR.

ARC164-BL-54
REF MX DWG 490977 REV A

Figure FO-4. CX-12999/ARC-164 Wiring Harness Schematic Diagram

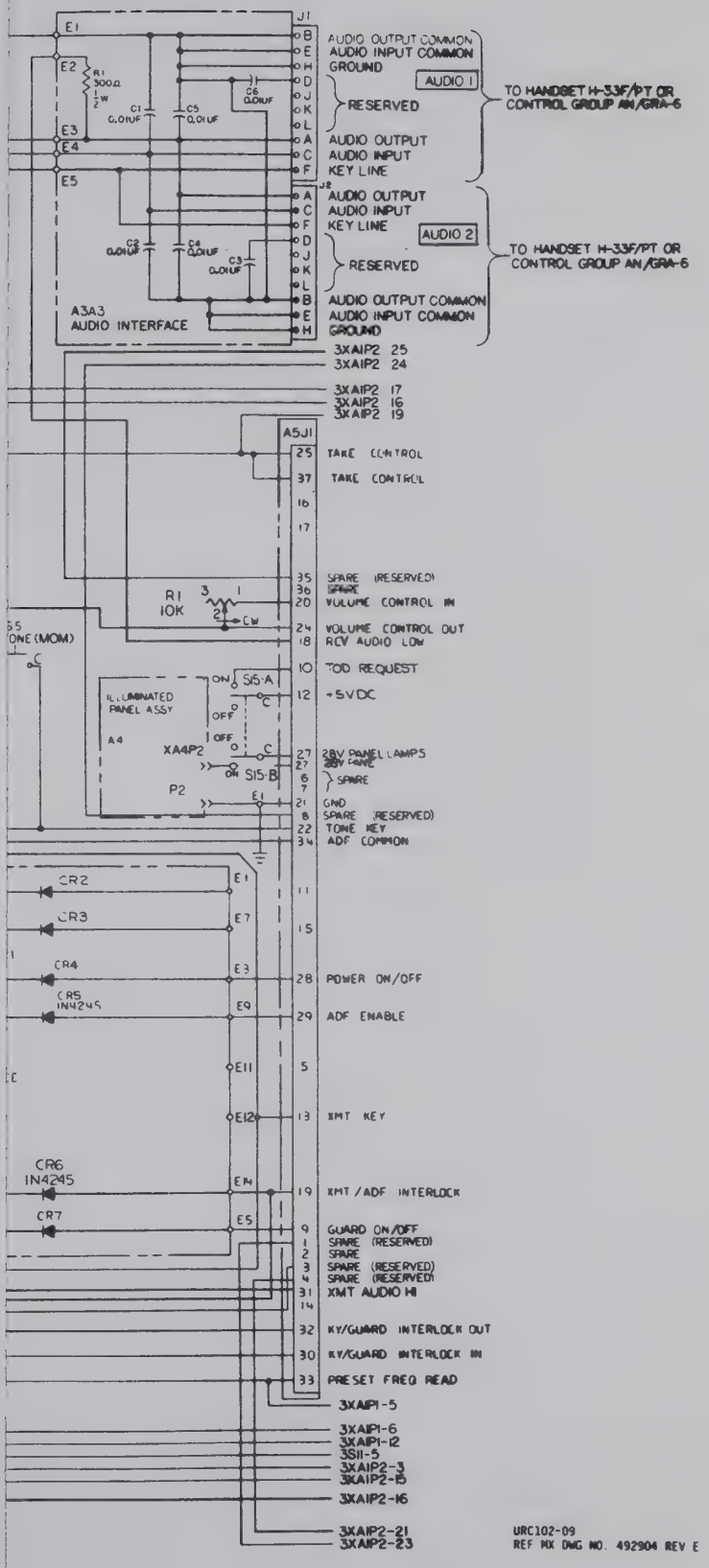


Figure FO-5. Switching Unit Panel Assembly C-10905/URC-99 Schematic Diagram (Sheet 1 of 2)

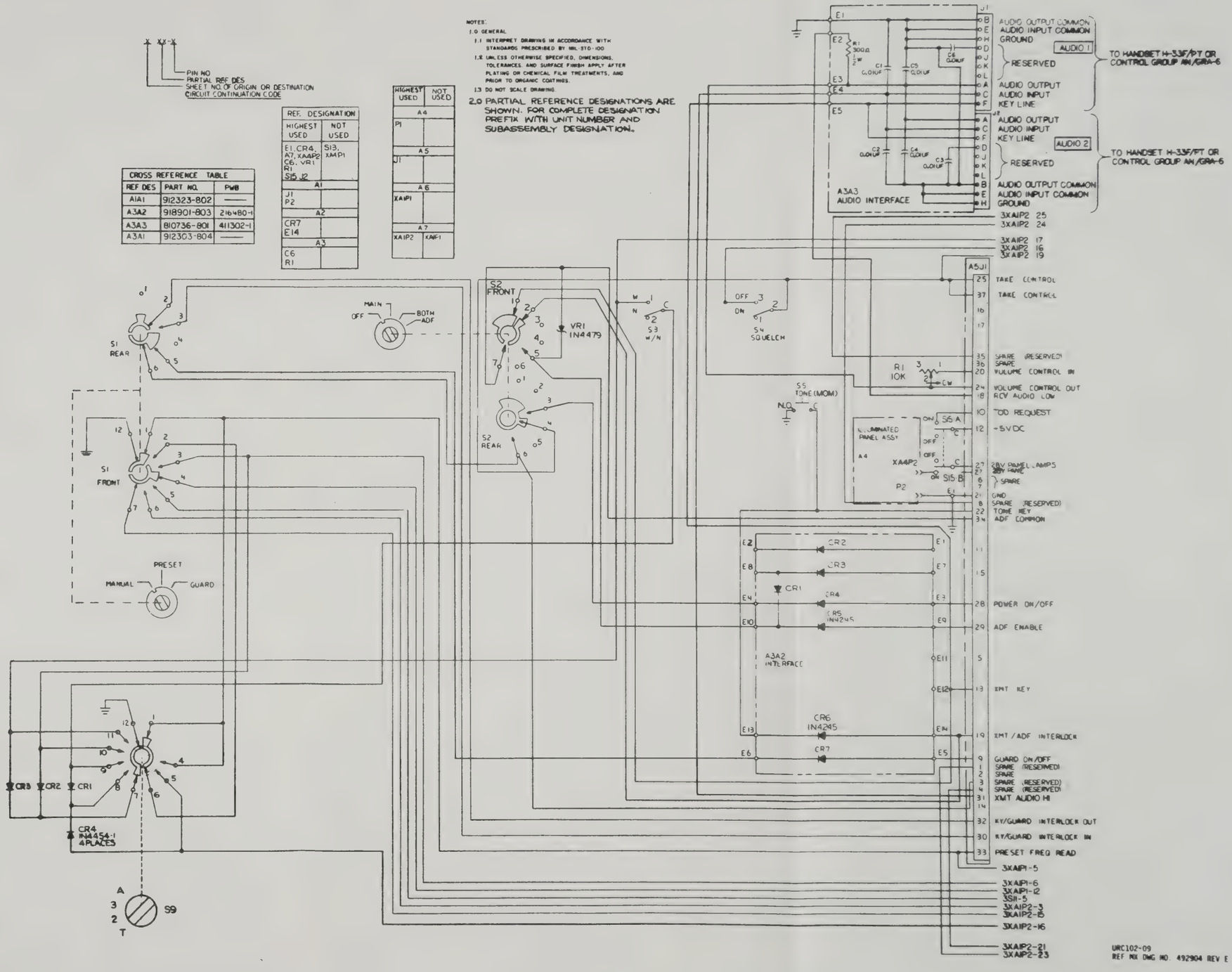


Figure FO-5. Switching Unit Panel Assembly C-10905/URC-99 Schematic Diagram (Sheet 1 of 2)

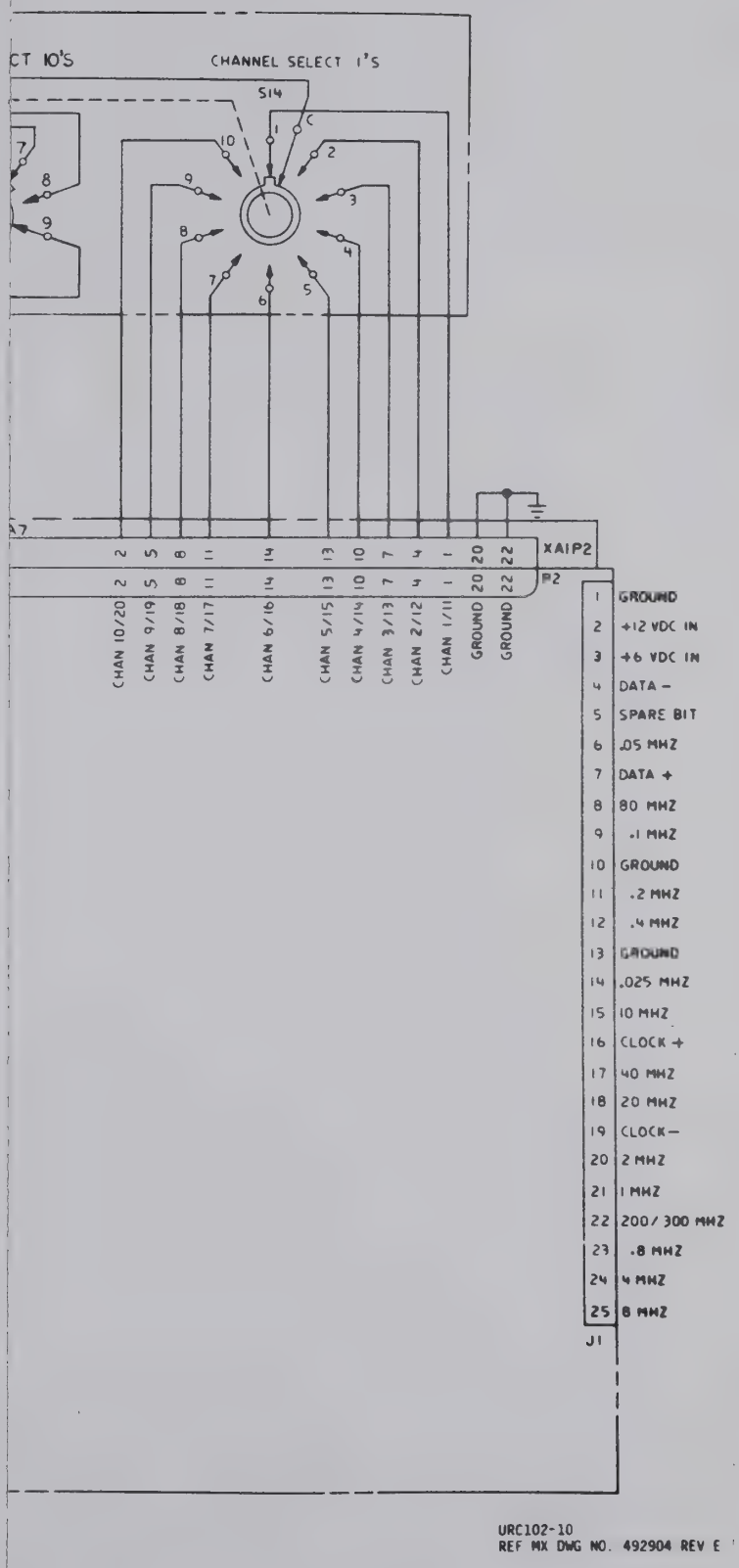


Figure FO-5. Switching Unit Panel Assembly C-10905/URC-99 Schematic Diagram (Sheet 2 of 2)

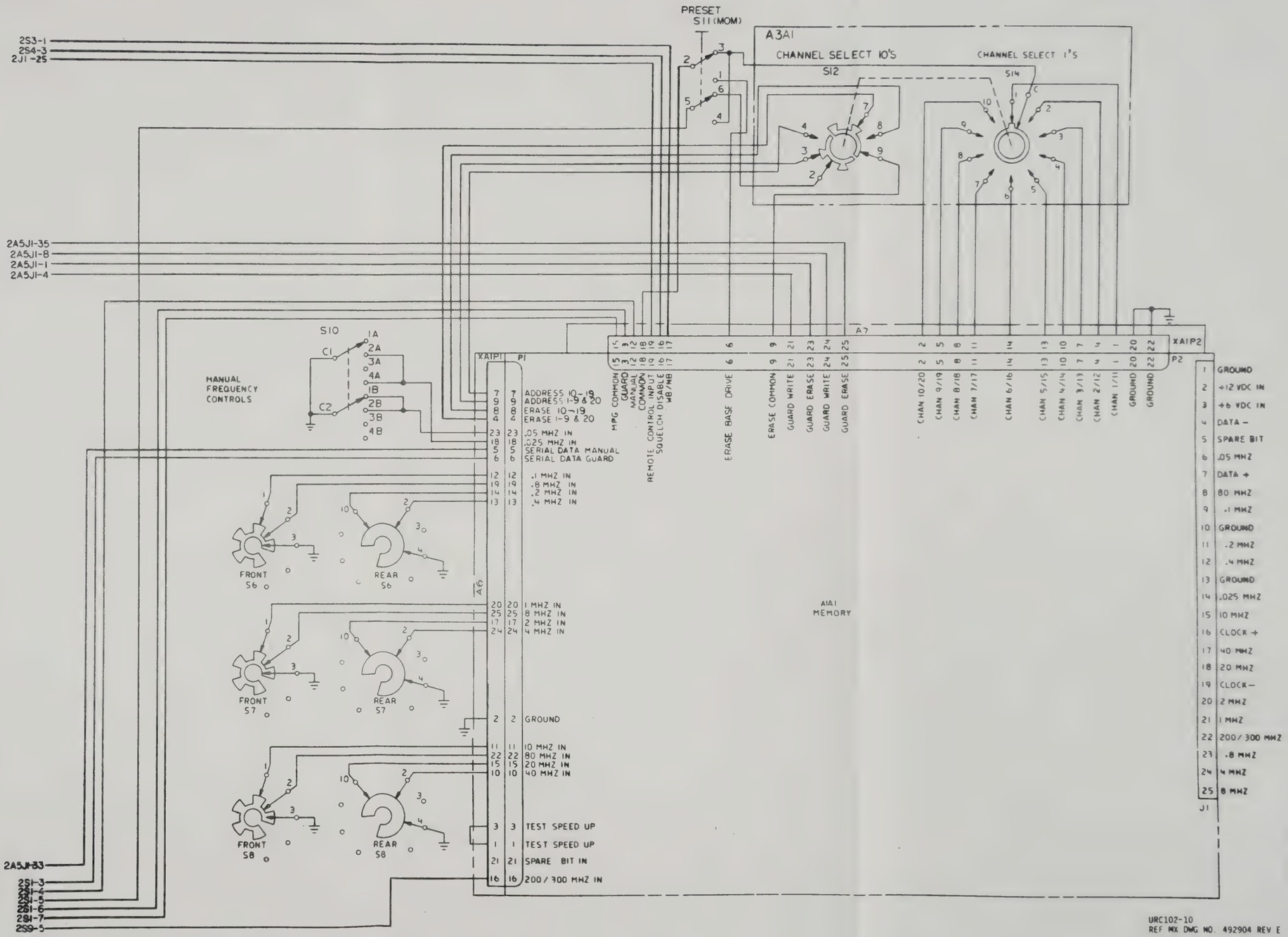


Figure FO-5. Switching Unit Panel Assembly C-10905/URC-99 Schematic Diagram (Sheet 2 of 2)

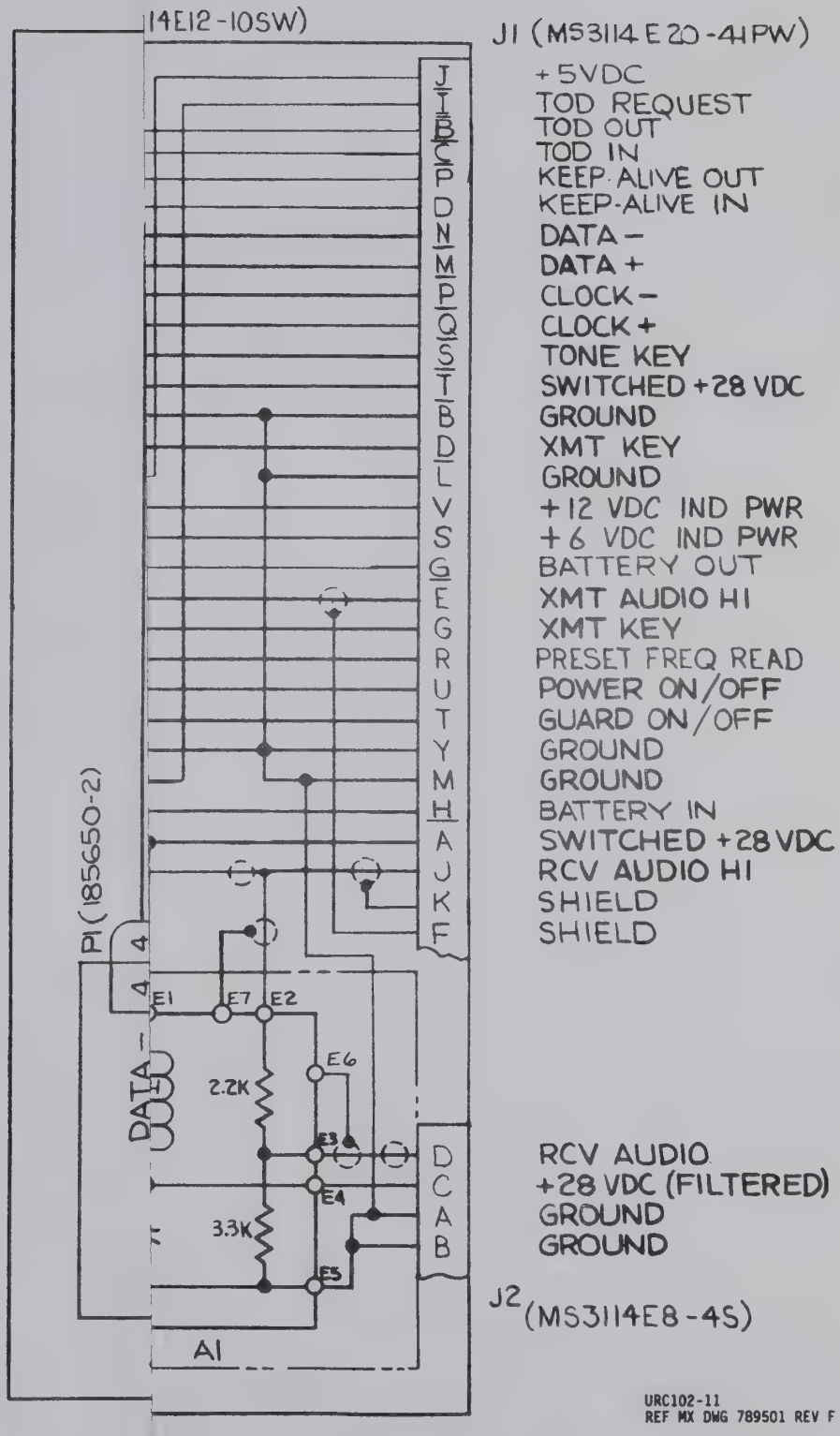


Figure FO-6. C-10905/URC-99 Wiring Harness Assembly, W1 Interconnect Diagram

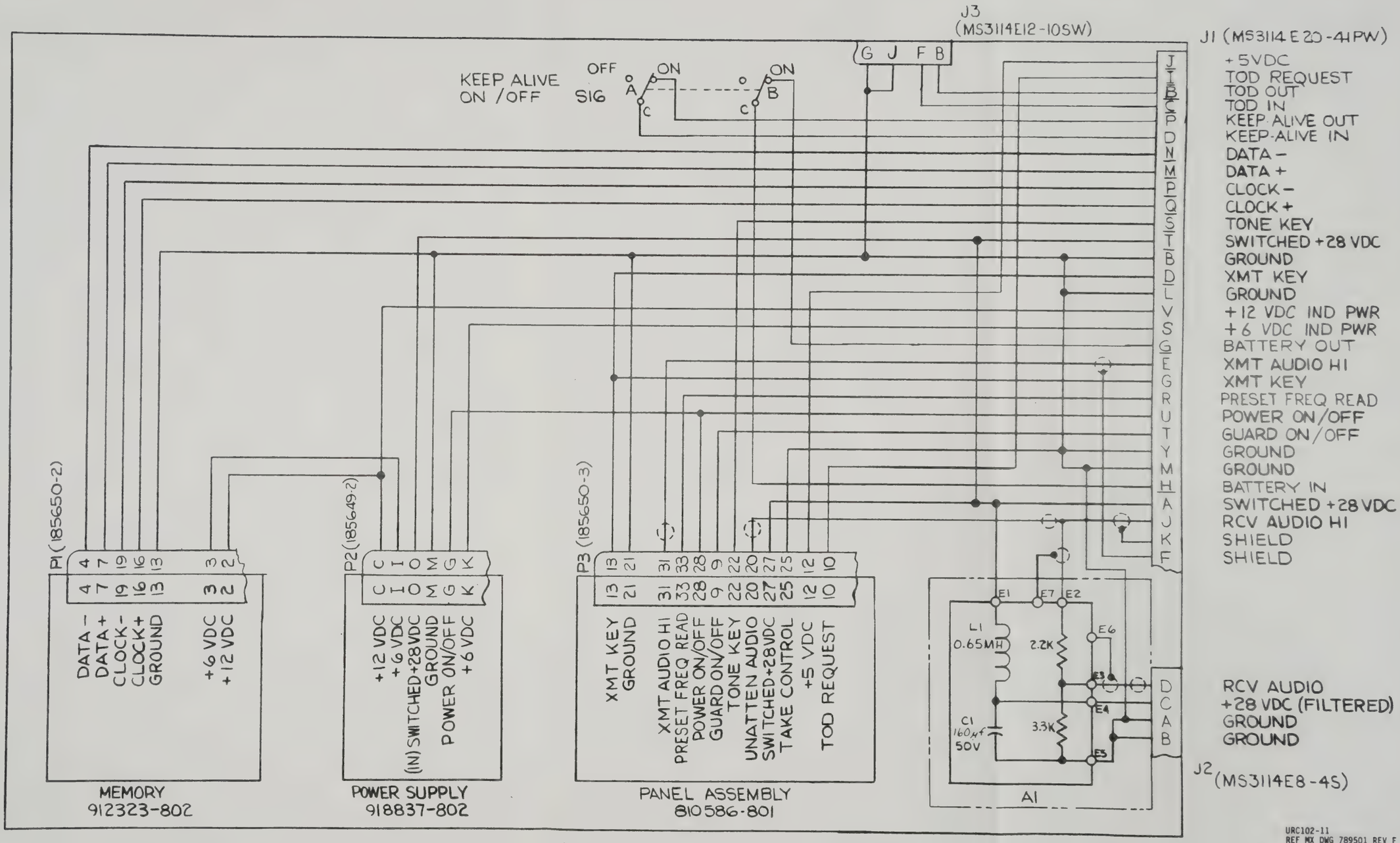


Figure FO-6. C-10905/URC-99 Wiring Harness Assembly, W1 Interconnect Diagram

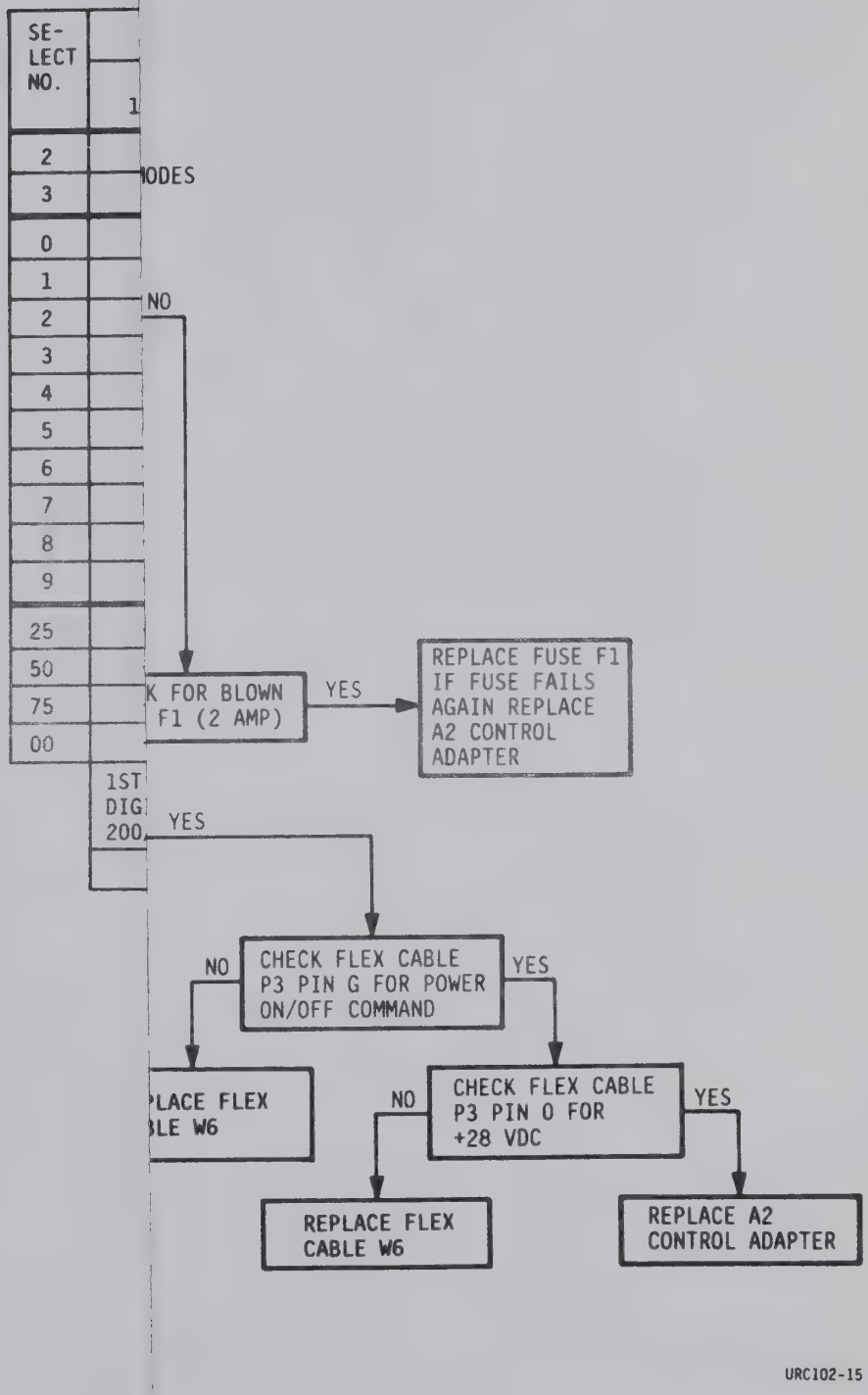


Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 1 of 3)

SE-LECT NO.	XA1P1 PIN NO.														
	16	22	10	15	11	25	24	17	20	19	13	14	12	23	18
2	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	-	L	L	L	L	L	L	L	L	L	L	L	L	-	-
1	-	L	L	L	H	L	L	L	H	L	L	L	H	-	-
2	-	L	L	H	L	L	L	H	L	L	L	H	L	-	-
3	-	L	L	H	H	L	L	H	H	L	L	H	H	-	-
4	-	L	H	L	L	L	H	L	L	L	H	L	L	-	-
5	-	L	H	L	H	L	H	L	H	L	H	L	H	-	-
6	-	L	H	H	L	L	H	H	L	L	H	H	L	-	-
7	-	L	H	H	H	L	H	H	H	L	H	H	H	-	-
8	-	H	L	L	L	H	L	L	L	H	L	L	L	-	-
9	-	H	L	L	H	H	L	L	H	H	L	L	H	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	L	L
50	-	-	-	-	-	-	-	-	-	-	-	-	-	H	H
75	-	-	-	-	-	-	-	-	-	-	-	-	-	H	L
00	-	-	-	-	-	-	-	-	-	-	-	-	-	L	H
1ST DIGIT 200/300		80	40	20	10	8	4	2	1	.8	.4	.2	.1	.05	.025
		2ND DIGIT				3RD DIGIT				4TH DIGIT				5TH DIGIT	
H = OPEN L = GROUND															

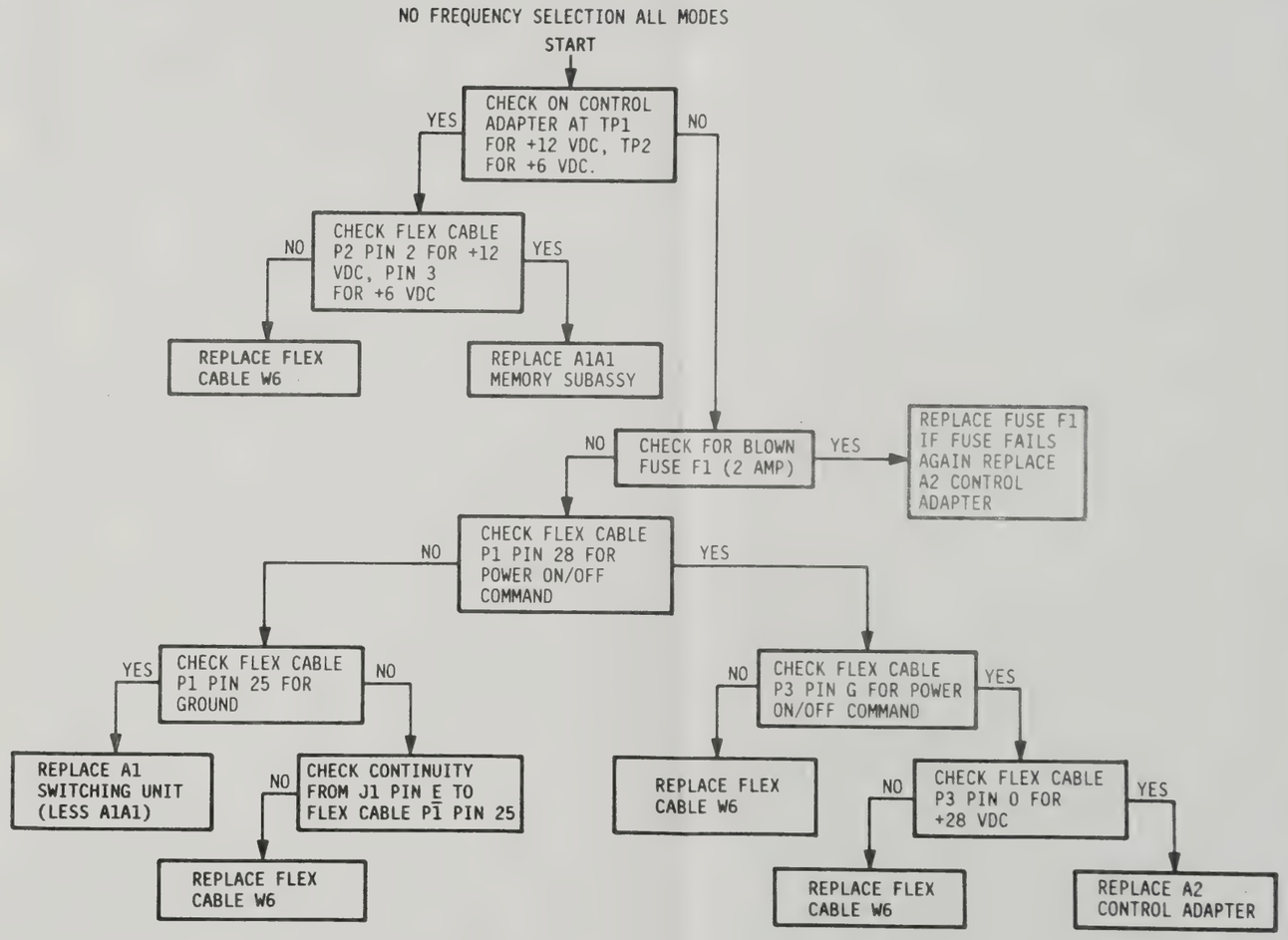
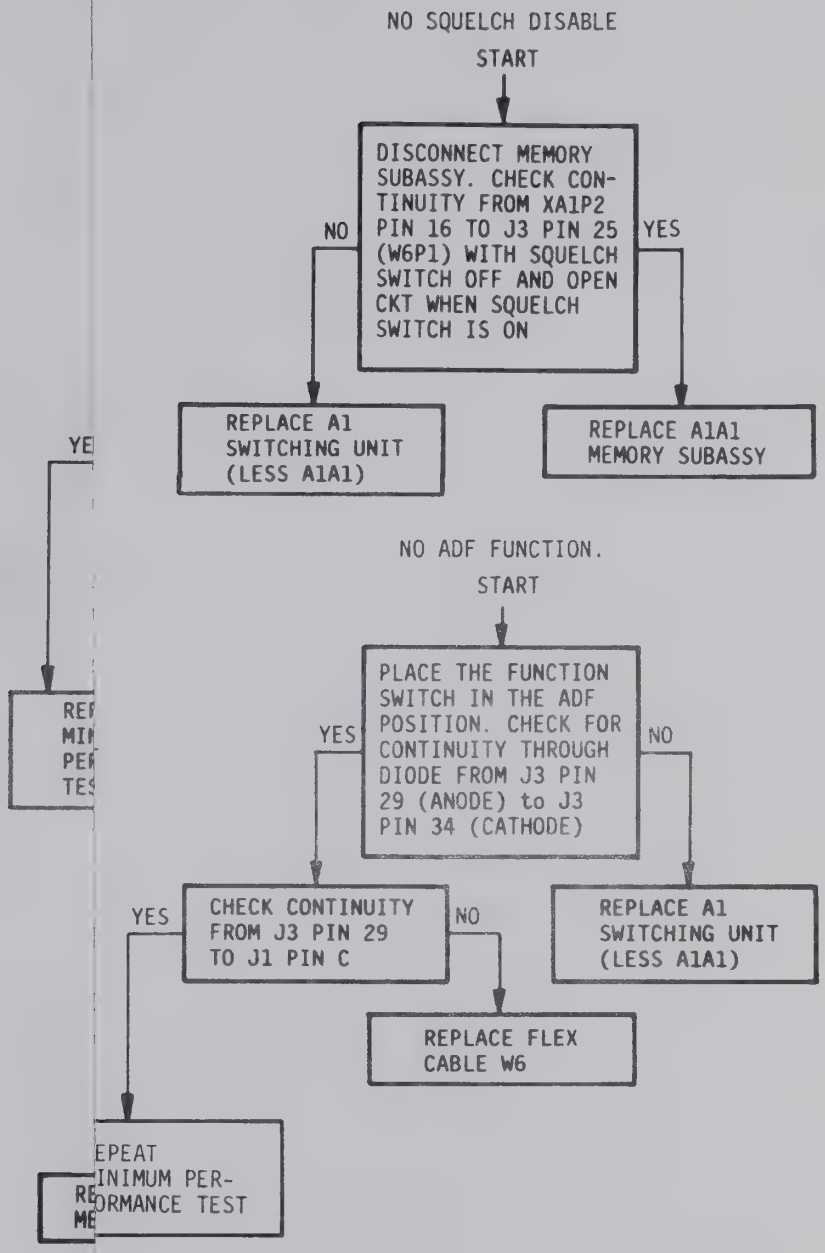

NO FREQUENCY SELECTION ALL MODES
START
CHECK ON CONTROL ADAPTER AT TP1 FOR +12 VDC, TP2 FOR +6 VDC.
YES
NO
CHECK FLEX CABLE P2 PIN 2 FOR +12 VDC, PIN 3 FOR +6 VDC
NO
YES
REPLACE FLEX CABLE W6
REPLACE A1A1 MEMORY SUBASSY
CHECK FOR BLOWN FUSE F1 (2 AMP)
NO
YES
REPLACE FUSE F1 IF FUSE FAILS AGAIN REPLACE A2 CONTROL ADAPTER
CHECK FLEX CABLE P1 PIN 28 FOR POWER ON/OFF COMMAND
NO
YES
CHECK FLEX CABLE P1 PIN 25 FOR GROUND
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
CHECK CONTINUITY FROM J1 PIN E TO FLEX CABLE P1 PIN 25
NO
REPLACE FLEX CABLE W6
CHECK FLEX CABLE P3 PIN G FOR POWER ON/OFF COMMAND
NO
YES
REPLACE FLEX CABLE W6
CHECK FLEX CABLE P3 PIN 0 FOR +28 VDC
NO
YES
REPLACE FLEX CABLE W6
REPLACE A2 CONTROL ADAPTER
URC102-15

Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 1 of 3)


NO SQUELCH DISABLE
START
DISCONNECT MEMORY SUBASSY. CHECK CONTINUITY FROM XA1P2 PIN 16 TO J3 PIN 25 (W6P1) WITH SQUELCH SWITCH OFF AND OPEN CKT WHEN SQUELCH SWITCH IS ON
NO
YES
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE A1A1 MEMORY SUBASSY
NO ADF FUNCTION.
START
PLACE THE FUNCTION SWITCH IN THE ADF POSITION. CHECK FOR CONTINUITY THROUGH DIODE FROM J3 PIN 29 (ANODE) to J3 PIN 34 (CATHODE)
YES
NO
CHECK CONTINUITY FROM J3 PIN 29 TO J1 PIN C
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE FLEX CABLE W6
EPEAT
INIMUM PER-
ORMANCE TEST

URC102-16

Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 2 of 3)

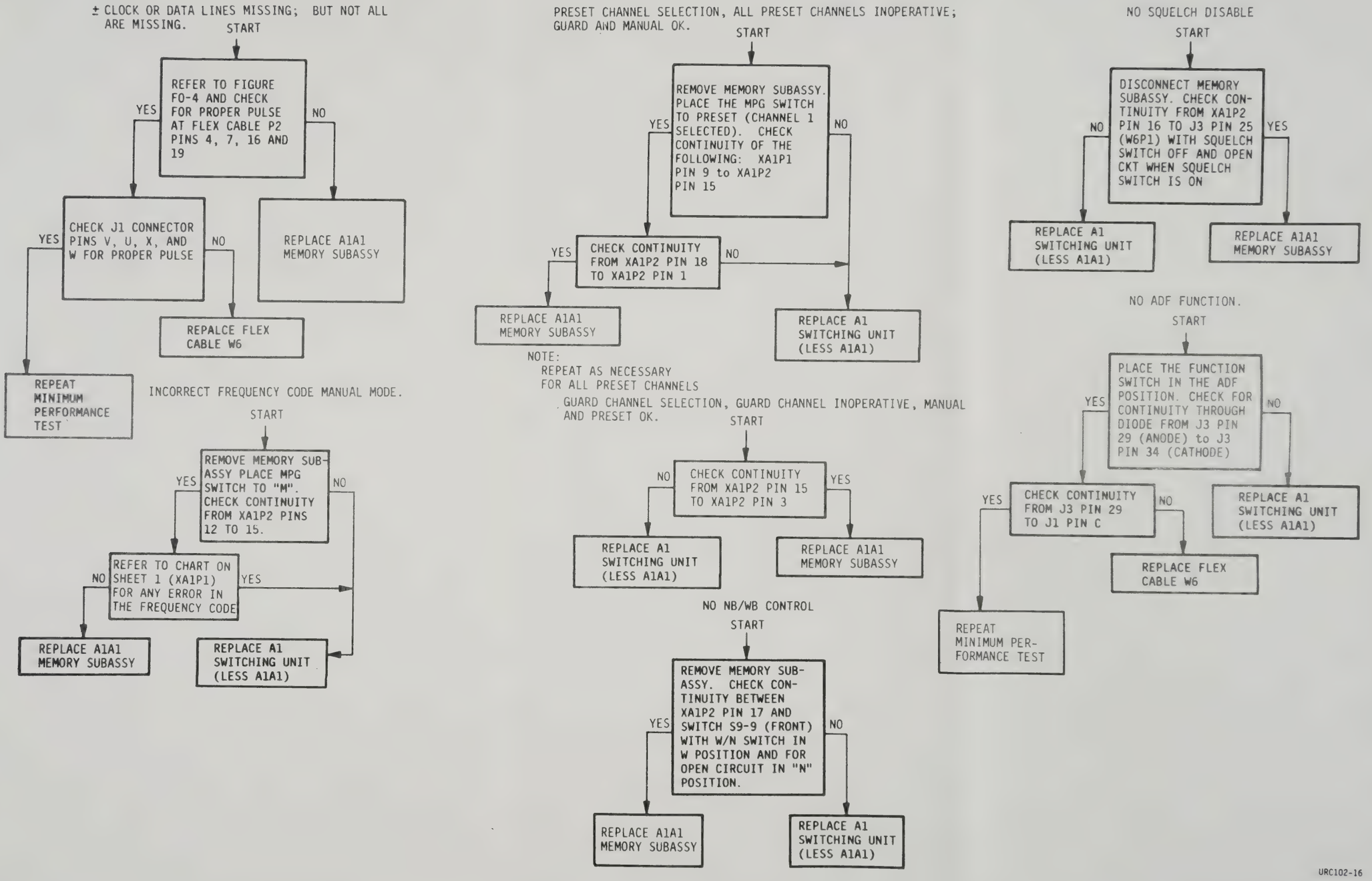

± CLOCK OR DATA LINES MISSING; BUT NOT ALL ARE MISSING.
START
REFER TO FIGURE FO-4 AND CHECK FOR PROPER PULSE AT FLEX CABLE P2 PINS 4, 7, 16 AND 19
YES
NO
CHECK J1 CONNECTOR PINS V, U, X, AND W FOR PROPER PULSE
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPALCE FLEX CABLE W6
REPEAT MINIMUM PERFORMANCE TEST
INCORRECT FREQUENCY CODE MANUAL MODE.
START
REMOVE MEMORY SUB-ASSY PLACE MPG SWITCH TO "M". CHECK CONTINUITY FROM XA1P2 PINS 12 TO 15.
YES
NO
REFER TO CHART ON SHEET 1 (XA1P1) FOR ANY ERROR IN THE FREQUENCY CODE
NO
YES
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)
PRESET CHANNEL SELECTION, ALL PRESET CHANNELS INOPERATIVE; GUARD AND MANUAL OK.
START
REMOVE MEMORY SUBASSY. PLACE THE MPG SWITCH TO PRESET (CHANNEL 1 SELECTED). CHECK CONTINUITY OF THE FOLLOWING: XA1P1 PIN 9 to XA1P2 PIN 15
YES
NO
CHECK CONTINUITY FROM XA1P2 PIN 18 TO XA1P2 PIN 1
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)
NOTE:
REPEAT AS NECESSARY FOR ALL PRESET CHANNELS
GUARD CHANNEL SELECTION, GUARD CHANNEL INOPERATIVE, MANUAL AND PRESET OK.
START
CHECK CONTINUITY FROM XA1P2 PIN 15 TO XA1P2 PIN 3
NO
YES
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE A1A1 MEMORY SUBASSY
NO NB/WB CONTROL
START
REMOVE MEMORY SUB-ASSY. CHECK CON-TINUITY BETWEEN XA1P2 PIN 17 AND SWITCH S9-9 (FRONT) WITH W/N SWITCH IN W POSITION AND FOR OPEN CIRCUIT IN "N" POSITION.
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)
NO SQUELCH DISABLE
START
DISCONNECT MEMORY SUBASSY. CHECK CON-TINUITY FROM XA1P2 PIN 16 TO J3 PIN 25 (W6P1) WITH SQUELCH SWITCH OFF AND OPEN CKT WHEN SQUELCH SWITCH IS ON
NO
YES
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE A1A1 MEMORY SUBASSY
NO ADF FUNCTION.
START
PLACE THE FUNCTION SWITCH IN THE ADF POSITION. CHECK FOR CONTINUITY THROUGH DIODE FROM J3 PIN 29 (ANODE) to J3 PIN 34 (CATHODE)
YES
NO
CHECK CONTINUITY FROM J3 PIN 29 TO J1 PIN C
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE FLEX CABLE W6
REPEAT MINIMUM PER-FORMANCE TEST
URC102-16

Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 2 of 3)

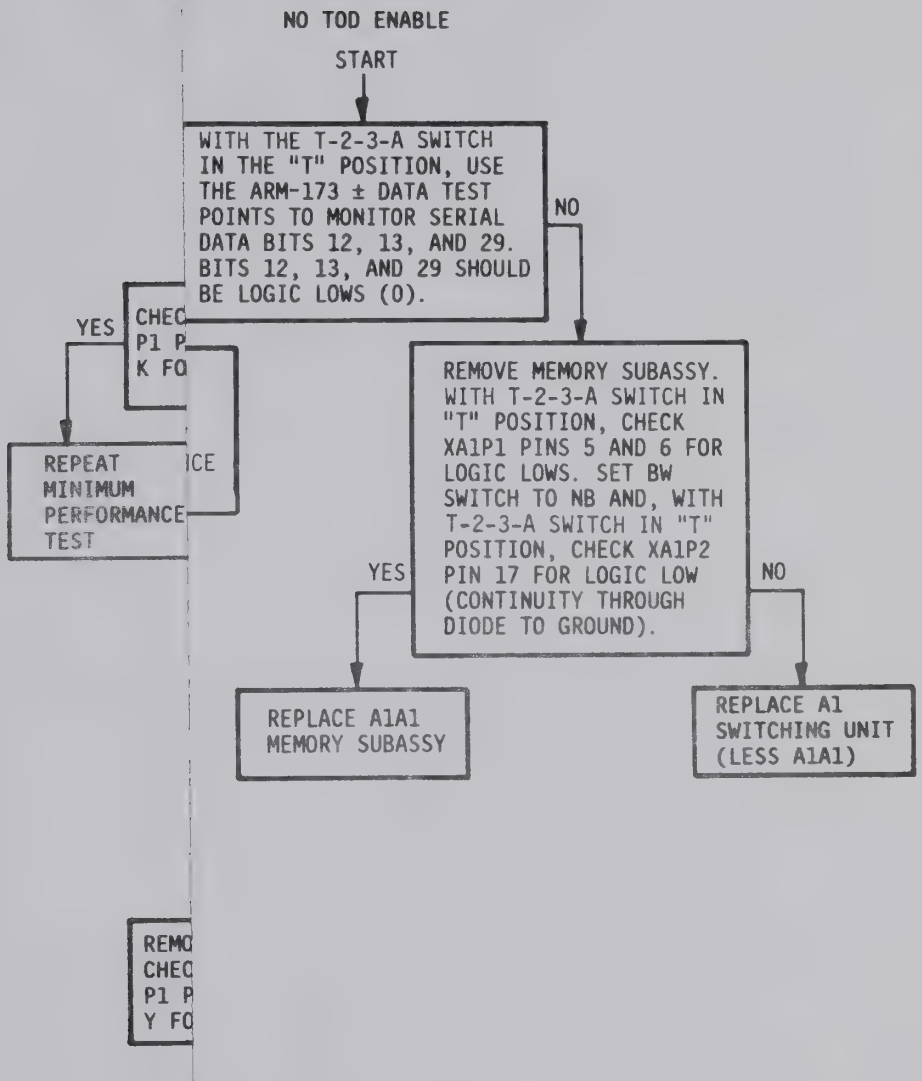
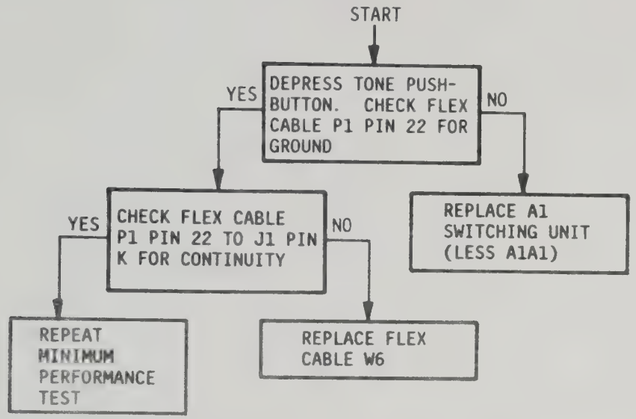
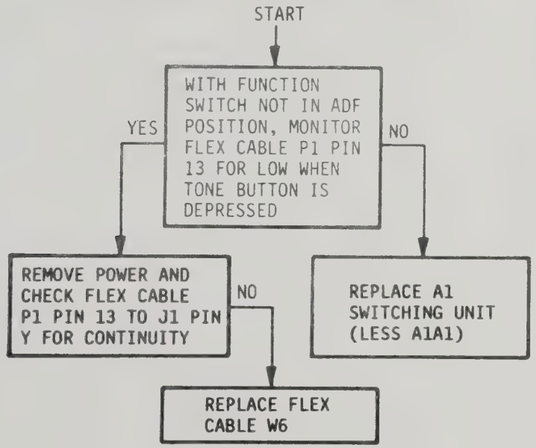

NO TOD ENABLE
START
WITH THE T-2-3-A SWITCH IN THE "T" POSITION, USE THE ARM-173 ± DATA TEST POINTS TO MONITOR SERIAL DATA BITS 12, 13, AND 29. BITS 12, 13, AND 29 SHOULD BE LOGIC LOWS (0).
NO
YES
CHEC
P1 P
K FO
ICE
REPEAT MINIMUM PERFORMANCE TEST
REMOVE MEMORY SUBASSY. WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P1 PINS 5 AND 6 FOR LOGIC LOWS. SET BW SWITCH TO NB AND, WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P2 PIN 17 FOR LOGIC LOW (CONTINUITY THROUGH DIODE TO GROUND).
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REMO
CHEC
P1 P
Y FO

Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 3 of 3)

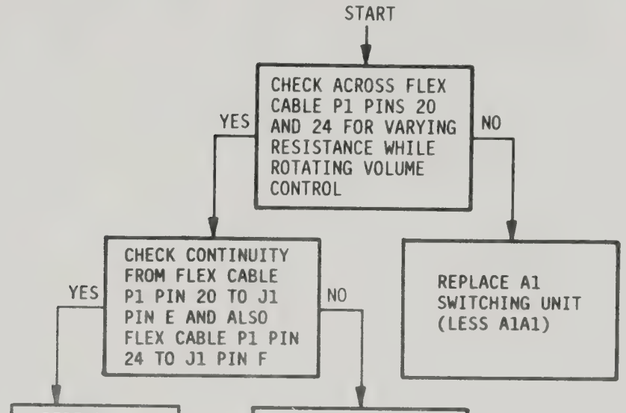
NO TONE CONTROL OR TOD XMIT


START
DEPRESS TONE PUSH-BUTTON. CHECK FLEX CABLE P1 PIN 22 FOR GROUND
YES
NO
CHECK FLEX CABLE P1 PIN 22 TO J1 PIN K FOR CONTINUITY
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPEAT MINIMUM PERFORMANCE TEST
REPLACE FLEX CABLE W6

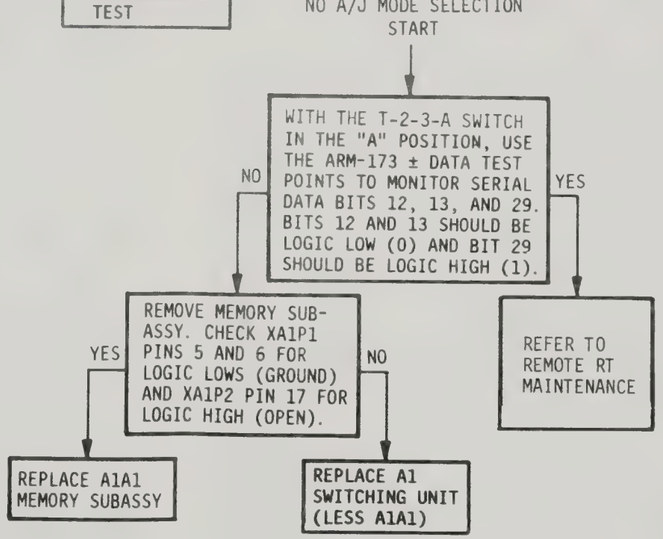
NO TONE XMIT, CONTROL BOX POWERED.


START
WITH FUNCTION SWITCH NOT IN ADF POSITION, MONITOR FLEX CABLE P1 PIN 13 FOR LOW WHEN TONE BUTTON IS DEPRESSED
YES
NO
REMOVE POWER AND CHECK FLEX CABLE P1 PIN 13 TO J1 PIN Y FOR CONTINUITY
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPLACE FLEX CABLE W6

NO VOLUME CONTROL


START
CHECK ACROSS FLEX CABLE P1 PINS 20 AND 24 FOR VARYING RESISTANCE WHILE ROTATING VOLUME CONTROL
YES
NO
CHECK CONTINUITY FROM FLEX CABLE P1 PIN 20 TO J1 PIN E AND ALSO FLEX CABLE P1 PIN 24 TO J1 PIN F
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1)
REPEAT MINIMUM PERFORMANCE TEST
REPLACE FLEX CABLE W6

NO A/J MODE SELECTION


START
WITH THE T-2-3-A SWITCH IN THE "A" POSITION, USE THE ARM-173 ± DATA TEST POINTS TO MONITOR SERIAL DATA BITS 12, 13, AND 29. BITS 12 AND 13 SHOULD BE LOGIC LOW (0) AND BIT 29 SHOULD BE LOGIC HIGH (1).
NO
YES
REMOVE MEMORY SUB-ASSY. CHECK XA1P1 PINS 5 AND 6 FOR LOGIC LOWS (GROUND) AND XA1P2 PIN 17 FOR LOGIC HIGH (OPEN).
YES
NO
REFER TO REMOTE RT MAINTENANCE
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)

NO TOD ENABLE

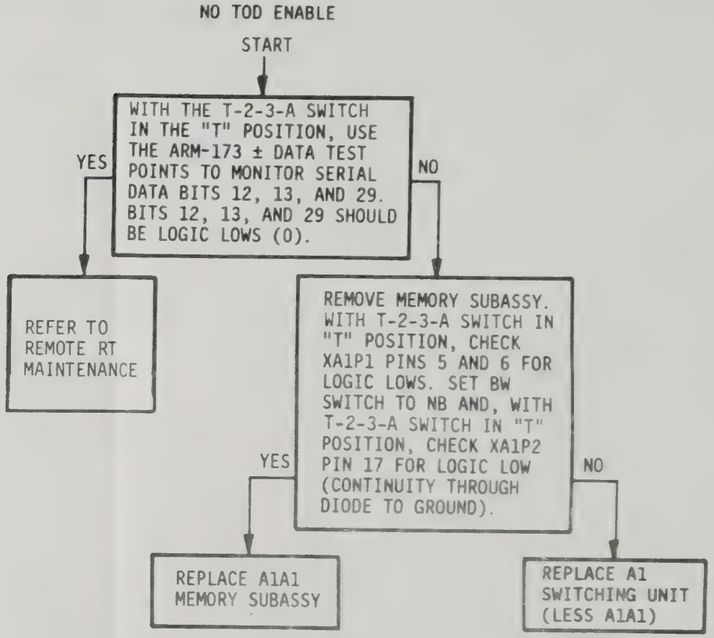
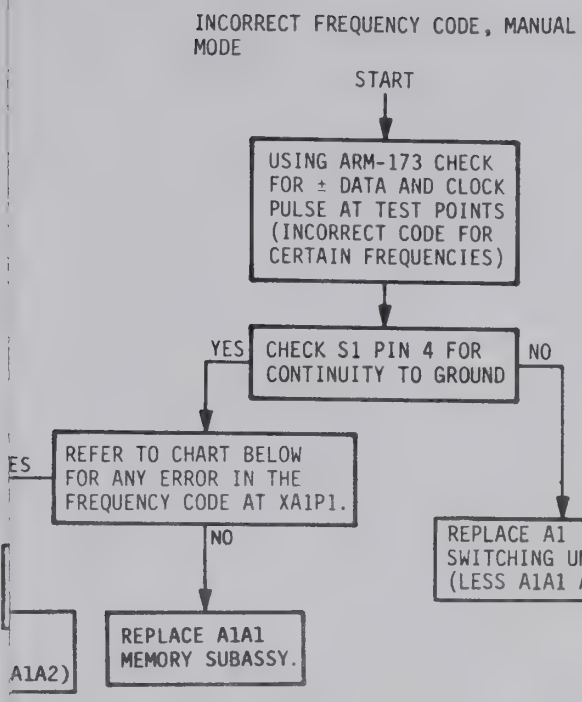

START
WITH THE T-2-3-A SWITCH IN THE "T" POSITION, USE THE ARM-173 ± DATA TEST POINTS TO MONITOR SERIAL DATA BITS 12, 13, AND 29. BITS 12, 13, AND 29 SHOULD BE LOGIC LOWS (0).
YES
NO
REFER TO REMOTE RT MAINTENANCE
REMOVE MEMORY SUBASSY. WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P1 PINS 5 AND 6 FOR LOGIC LOWS. SET BW SWITCH TO NB AND, WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P2 PIN 17 FOR LOGIC LOW (CONTINUITY THROUGH DIODE TO GROUND).
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1)

Figure FO-7. Radio Set Control C-10904/ URC-98 Trouble Analysis (Sheet 3 of 3)


INCORRECT FREQUENCY CODE, MANUAL MODE
START
USING ARM-173 CHECK FOR ± DATA AND CLOCK PULSE AT TEST POINTS (INCORRECT CODE FOR CERTAIN FREQUENCIES)
YES
CHECK S1 PIN 4 FOR CONTINUITY TO GROUND
NO
ES
REFER TO CHART BELOW FOR ANY ERROR IN THE FREQUENCY CODE AT XA1P1.
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
A1A2)
REPLACE A1A1 MEMORY SUBASSY.

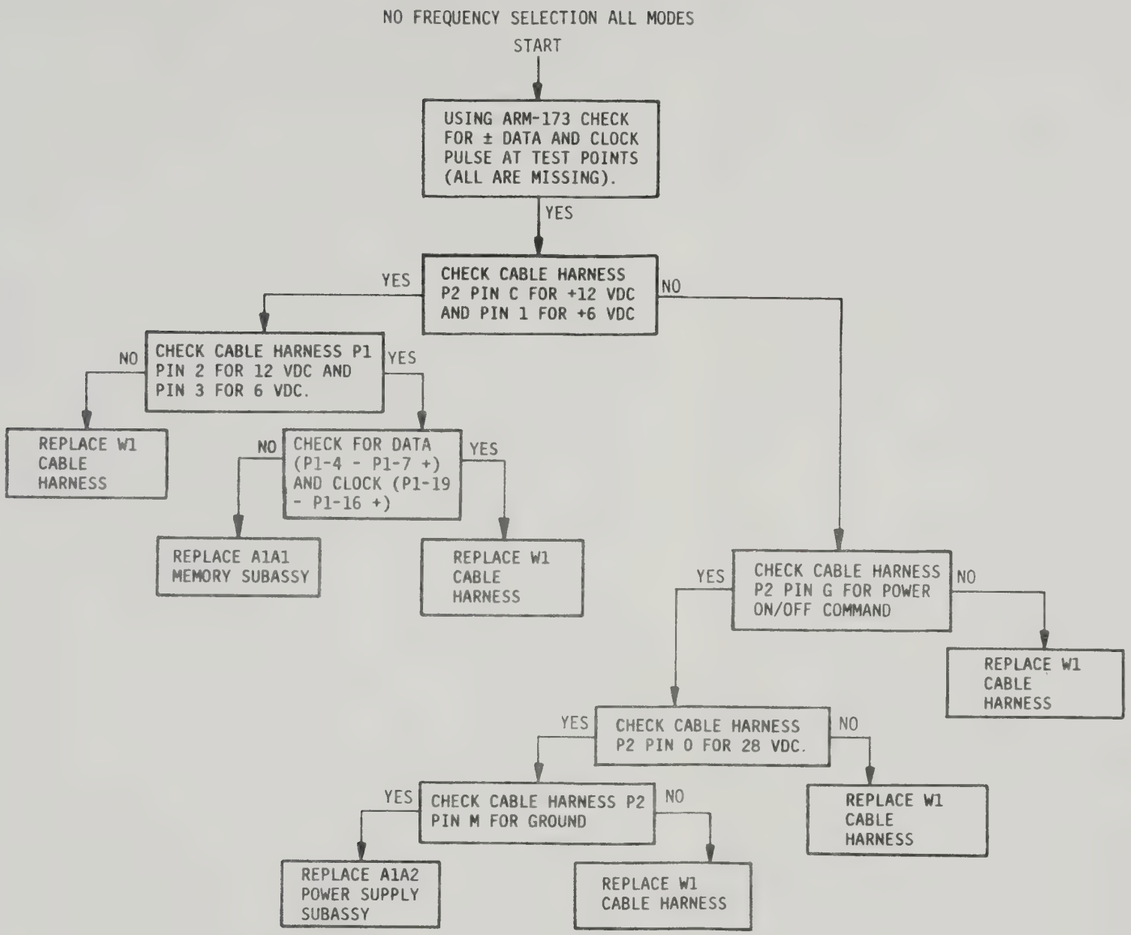
PIN NUMBER													
10	15	11	25	24	17	20	19	13	14	12	23	18	XA1P1
-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	
L	L	L	L	L	L	L	L	L	L	L	-	-	
L	L	H	L	L	L	H	L	L	L	H	-	-	
L	H	L	L	L	H	L	L	L	H	L	-	-	
L	H	H	L	L	H	H	L	L	H	H	-	-	
H	L	L	L	H	L	L	L	H	L	L	-	-	
H	L	H	L	H	L	H	L	H	L	H	-	-	
H	H	L	L	H	H	L	L	H	H	L	-	-	
H	H	H	L	H	H	H	L	H	H	H	-	-	
L	L	L	H	L	L	L	H	L	L	L	-	-	
L	L	H	H	L	L	H	H	L	L	H	-	-	
-	-	-	-	-	-	-	-	-	-	-	L	H	
-	-	-	-	-	-	-	-	-	-	-	L	L	
-	-	-	-	-	-	-	-	-	-	-	H	H	
-	-	-	-	-	-	-	-	-	-	-	H	L	
40	20	10	8	4	2	1	.8	.4	.2	.1	.05	.025	
2ND DIGIT			3RD DIGIT				4TH DIGIT				5TH DIGIT		

H = HIGH = OPEN
L = LOW = SHORT
} AT XA1P1

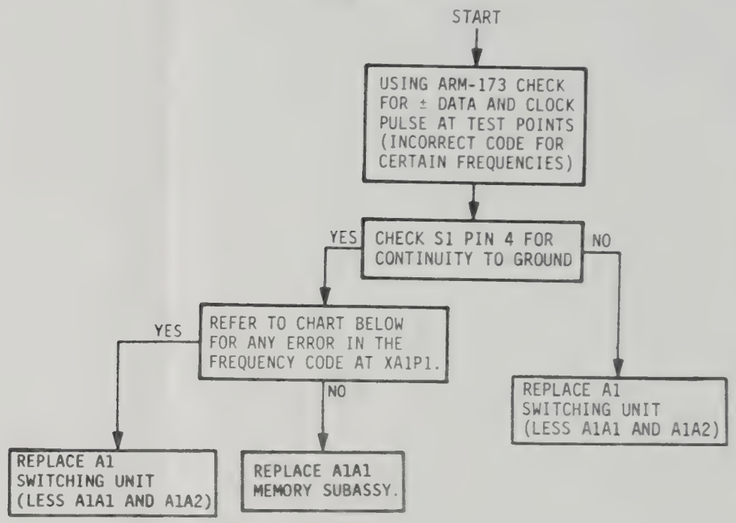
URC102-23

Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 1 of 3)

NO FREQUENCY SELECTION ALL MODES


START
USING ARM-173 CHECK FOR ± DATA AND CLOCK PULSE AT TEST POINTS (ALL ARE MISSING).
YES
CHECK CABLE HARNESS P2 PIN C FOR +12 VDC AND PIN 1 FOR +6 VDC
YES
NO
CHECK CABLE HARNESS P1 PIN 2 FOR 12 VDC AND PIN 3 FOR 6 VDC.
NO
YES
REPLACE W1 CABLE HARNESS
CHECK FOR DATA (P1-4 - P1-7 +) AND CLOCK (P1-19 - P1-16 +)
NO
YES
REPLACE A1A1 MEMORY SUBASSY
REPLACE W1 CABLE HARNESS
YES
CHECK CABLE HARNESS P2 PIN G FOR POWER ON/OFF COMMAND
NO
REPLACE W1 CABLE HARNESS
YES
CHECK CABLE HARNESS P2 PIN 0 FOR 28 VDC.
NO
REPLACE W1 CABLE HARNESS
YES
CHECK CABLE HARNESS P2 PIN M FOR GROUND
NO
REPLACE A1A2 POWER SUPPLY SUBASSY
REPLACE W1 CABLE HARNESS

INCORRECT FREQUENCY CODE, MANUAL MODE


START
USING ARM-173 CHECK FOR ± DATA AND CLOCK PULSE AT TEST POINTS (INCORRECT CODE FOR CERTAIN FREQUENCIES)
YES
CHECK S1 PIN 4 FOR CONTINUITY TO GROUND
NO
YES
REFER TO CHART BELOW FOR ANY ERROR IN THE FREQUENCY CODE AT XA1P1.
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPLACE A1A1 MEMORY SUBASSY.
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)

	PIN NUMBER														
	16	22	10	15	11	25	24	17	20	19	13	14	12	23	18	XA1P1
SELECT NO.																
2	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0	-	L	L	L	L	L	L	L	L	L	L	L	L	-	-	
1	-	L	L	L	H	L	L	L	H	L	L	L	H	-	-	
2	-	L	L	H	L	L	L	H	L	L	L	H	L	-	-	
3	-	L	L	H	H	L	L	H	H	L	L	H	H	-	-	
4	-	L	H	L	L	L	H	L	L	L	H	L	L	-	-	
5	-	L	H	L	H	L	H	L	H	L	H	L	H	-	-	
6	-	L	H	H	L	L	H	H	L	L	H	H	L	-	-	
7	-	L	H	H	H	L	H	H	H	L	H	H	H	-	-	
8	-	H	L	L	L	H	L	L	L	H	L	L	L	-	-	
9	-	H	L	L	H	H	L	L	H	H	L	L	H	-	-	
00	-	-	-	-	-	-	-	-	-	-	-	-	-	L	H	
25	-	-	-	-	-	-	-	-	-	-	-	-	-	L	L	
50	-	-	-	-	-	-	-	-	-	-	-	-	-	H	H	
75	-	-	-	-	-	-	-	-	-	-	-	-	-	H	L	
	1ST DIGIT 200/300	80	40	20	10	8	4	2	1	.8	.4	.2	.1	.05	.025	
		2ND DIGIT				3RD DIGIT				4TH DIGIT				5TH DIGIT		

H = HIGH = OPEN
L = LOW = SHORT
} AT XA1P1

URC102-23

Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 1 of 3)

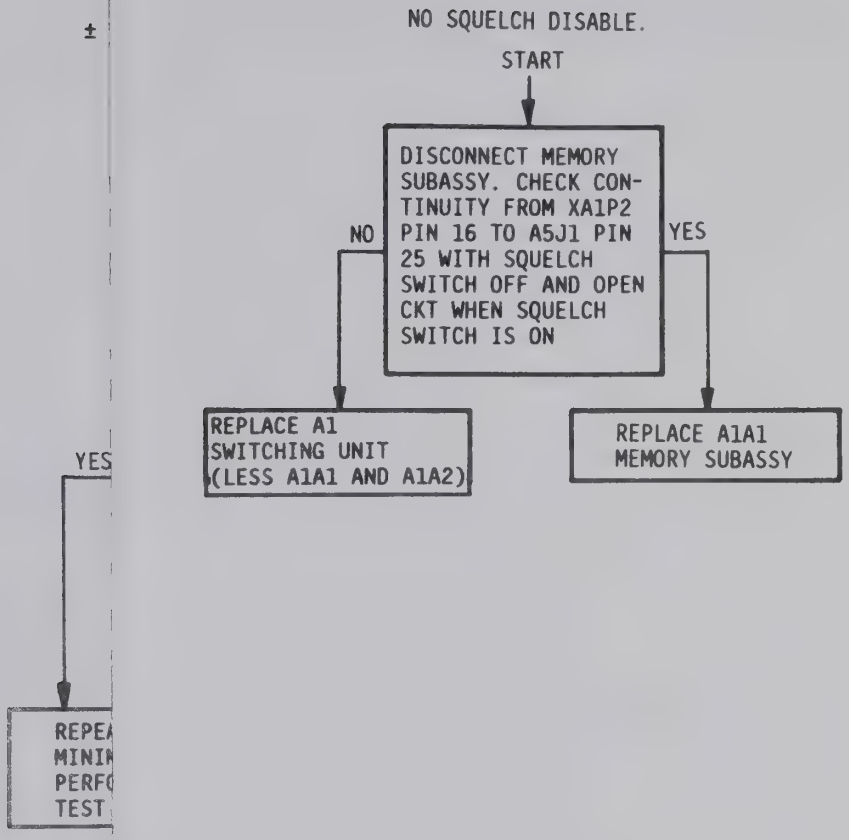
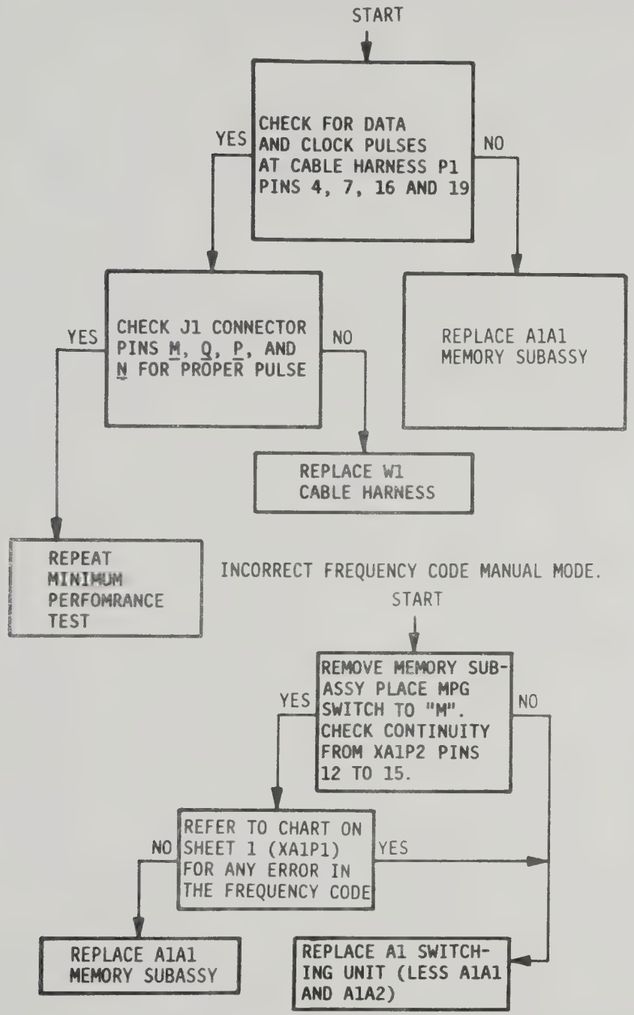


Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 2 of 3)

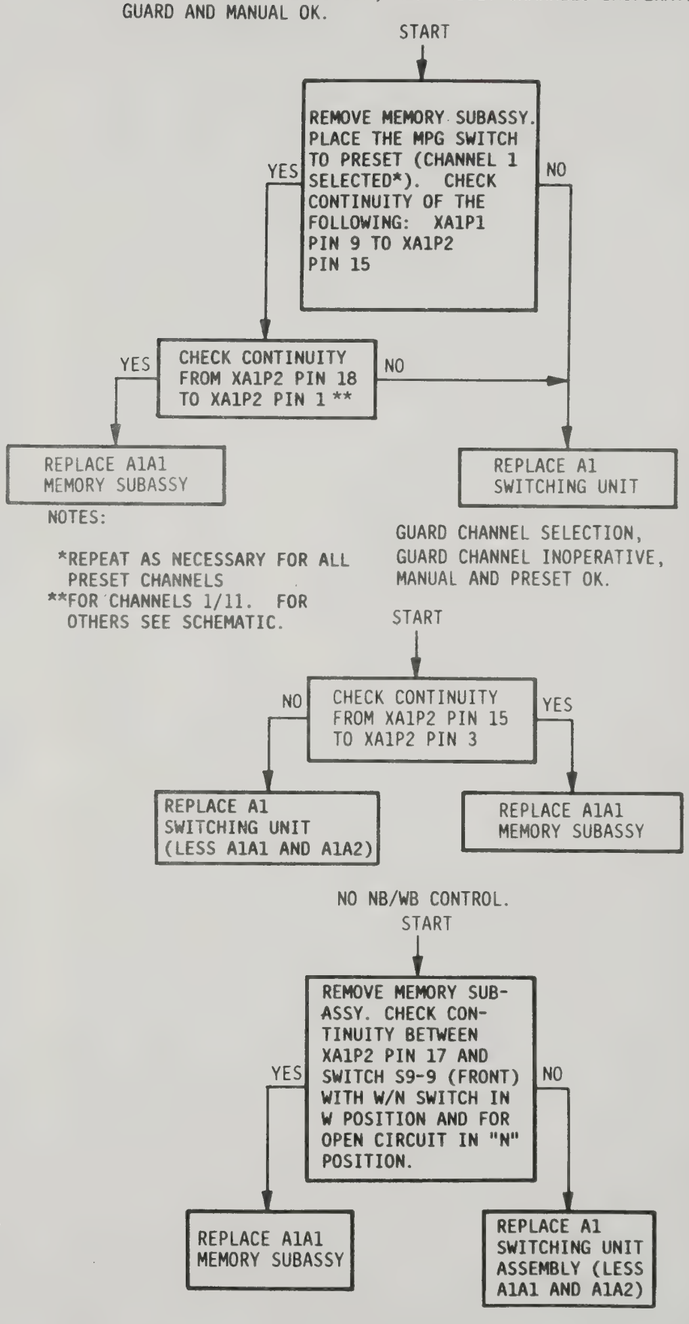
± CLOCK OR DATA LINES MISSING; BUT NOT ALL ARE MISSING


START
CHECK FOR DATA AND CLOCK PULSES AT CABLE HARNESS P1 PINS 4, 7, 16 AND 19
YES
NO
CHECK J1 CONNECTOR PINS M, Q, P, AND N FOR PROPER PULSE
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE W1 CABLE HARNESS
REPEAT MINIMUM PERFOMRANCE TEST

INCORRECT FREQUENCY CODE MANUAL MODE.

START
REMOVE MEMORY SUB-ASSY PLACE MPG SWITCH TO "M". CHECK CONTINUITY FROM XA1P2 PINS 12 TO 15.
YES
NO
REFER TO CHART ON SHEET 1 (XA1P1) FOR ANY ERROR IN THE FREQUENCY CODE
NO
YES
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCH-ING UNIT (LESS A1A1 AND A1A2)

PRESET CHANNEL SELECTION, ALL PRESET CHANNELS INOPERATIVE; GUARD AND MANUAL OK.


START
REMOVE MEMORY SUBASSY. PLACE THE MPG SWITCH TO PRESET (CHANNEL 1 SELECTED*). CHECK CONTINUITY OF THE FOLLOWING: XA1P1 PIN 9 TO XA1P2 PIN 15
YES
NO
CHECK CONTINUITY FROM XA1P2 PIN 18 TO XA1P2 PIN 1 **
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT

NOTES:

*REPEAT AS NECESSARY FOR ALL PRESET CHANNELS
**FOR CHANNELS 1/11. FOR OTHERS SEE SCHEMATIC.

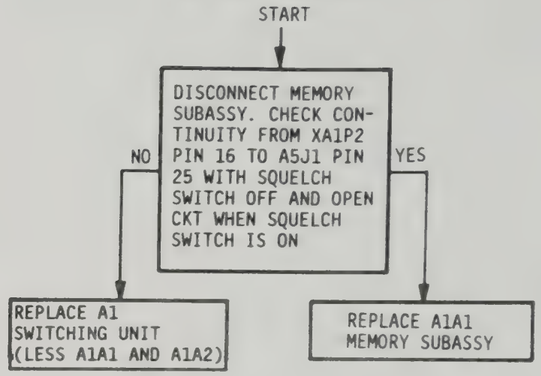
GUARD CHANNEL SELECTION, GUARD CHANNEL INOPERATIVE, MANUAL AND PRESET OK.

START
CHECK CONTINUITY FROM XA1P2 PIN 15 TO XA1P2 PIN 3
NO
YES
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPLACE A1A1 MEMORY SUBASSY

NO NB/WB CONTROL.

START
REMOVE MEMORY SUB-ASSY. CHECK CON-TINUITY BETWEEN XA1P2 PIN 17 AND SWITCH S9-9 (FRONT) WITH W/N SWITCH IN W POSITION AND FOR OPEN CIRCUIT IN "N" POSITION.
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT ASSEMBLY (LESS A1A1 AND A1A2)

NO SQUELCH DISABLE.


START
DISCONNECT MEMORY SUBASSY. CHECK CON-TINUITY FROM XA1P2 PIN 16 TO A5J1 PIN 25 WITH SQUELCH SWITCH OFF AND OPEN CKT WHEN SQUELCH SWITCH IS ON
NO
YES
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPLACE A1A1 MEMORY SUBASSY

URC102-24

Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 2 of 3)

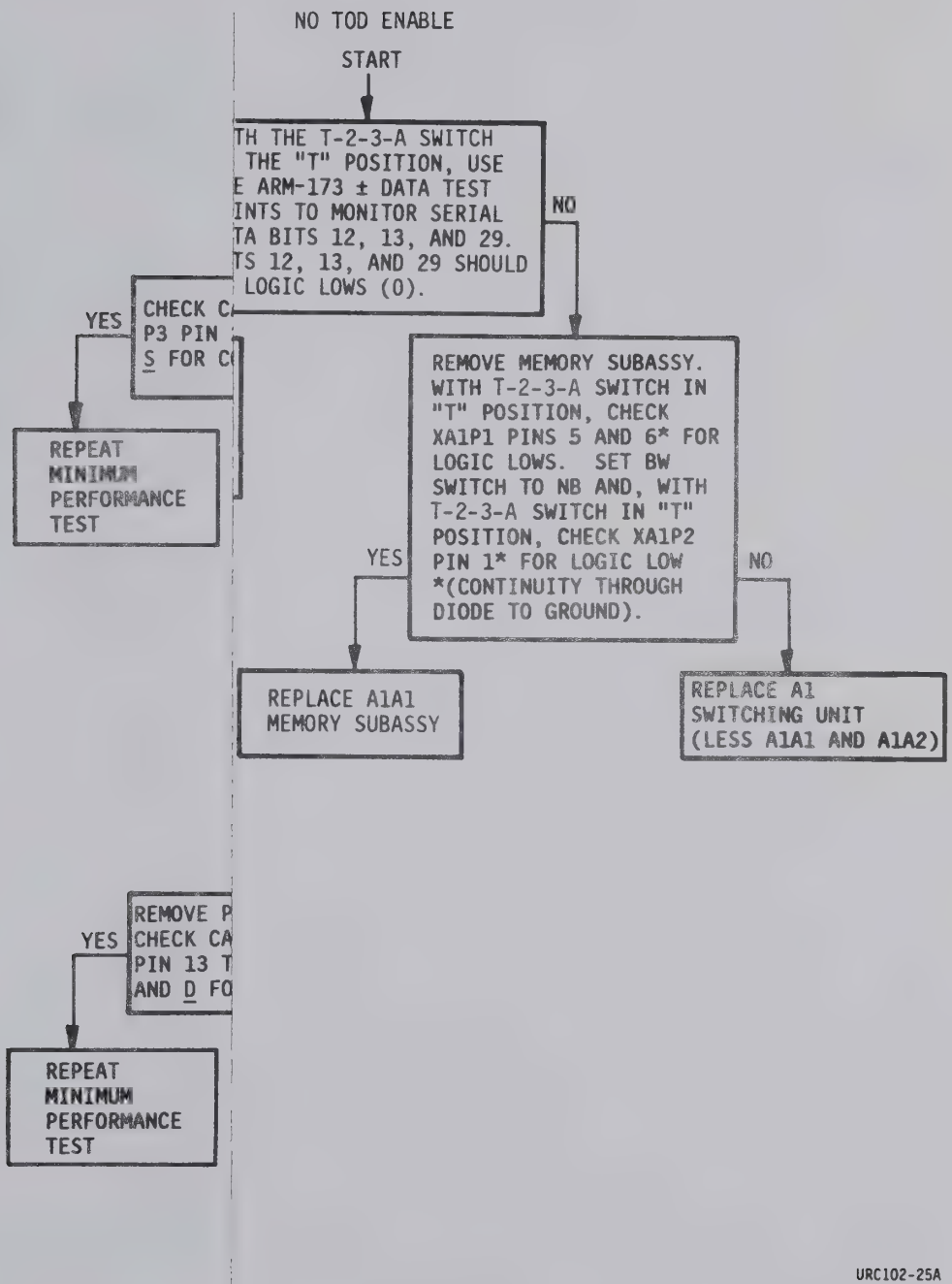


Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 3 of 3)

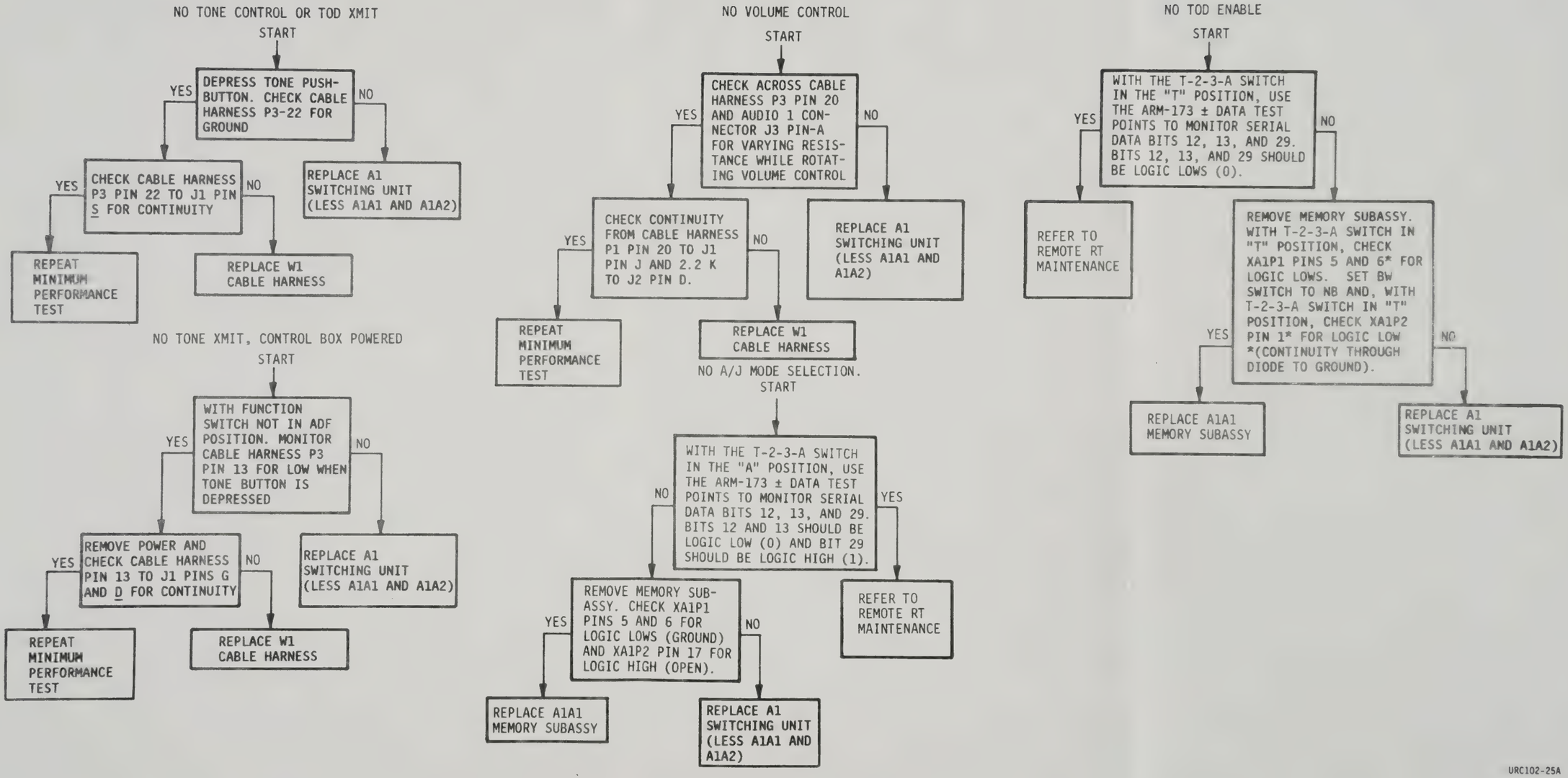

NO TONE CONTROL OR TOD XMIT
START
DEPRESS TONE PUSH-BUTTON. CHECK CABLE HARNESS P3-22 FOR GROUND
YES
NO
CHECK CABLE HARNESS P3 PIN 22 TO J1 PIN S FOR CONTINUITY
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPEAT MINIMUM PERFORMANCE TEST
REPLACE W1 CABLE HARNESS
NO TONE XMIT, CONTROL BOX POWERED
START
WITH FUNCTION SWITCH NOT IN ADF POSITION. MONITOR CABLE HARNESS P3 PIN 13 FOR LOW WHEN TONE BUTTON IS DEPRESSED
YES
NO
REMOVE POWER AND CHECK CABLE HARNESS PIN 13 TO J1 PINS G AND D FOR CONTINUITY
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPEAT MINIMUM PERFORMANCE TEST
REPLACE W1 CABLE HARNESS
NO VOLUME CONTROL
START
CHECK ACROSS CABLE HARNESS P3 PIN 20 AND AUDIO 1 CONNECTOR J3 PIN-A FOR VARYING RESISTANCE WHILE ROTATING VOLUME CONTROL
YES
NO
CHECK CONTINUITY FROM CABLE HARNESS P1 PIN 20 TO J1 PIN J AND 2.2 K TO J2 PIN D.
YES
NO
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
REPEAT MINIMUM PERFORMANCE TEST
REPLACE W1 CABLE HARNESS
NO A/J MODE SELECTION.
START
WITH THE T-2-3-A SWITCH IN THE "A" POSITION, USE THE ARM-173 ± DATA TEST POINTS TO MONITOR SERIAL DATA BITS 12, 13, AND 29. BITS 12 AND 13 SHOULD BE LOGIC LOW (0) AND BIT 29 SHOULD BE LOGIC HIGH (1).
NO
YES
REMOVE MEMORY SUB-ASSY. CHECK XA1P1 PINS 5 AND 6 FOR LOGIC LOWS (GROUND) AND XA1P2 PIN 17 FOR LOGIC HIGH (OPEN).
YES
NO
REFER TO REMOTE RT MAINTENANCE
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
NO TOD ENABLE
START
WITH THE T-2-3-A SWITCH IN THE "T" POSITION, USE THE ARM-173 ± DATA TEST POINTS TO MONITOR SERIAL DATA BITS 12, 13, AND 29. BITS 12, 13, AND 29 SHOULD BE LOGIC LOWS (0).
YES
NO
REFER TO REMOTE RT MAINTENANCE
REMOVE MEMORY SUBASSY. WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P1 PINS 5 AND 6* FOR LOGIC LOWS. SET BW SWITCH TO NB AND, WITH T-2-3-A SWITCH IN "T" POSITION, CHECK XA1P2 PIN 1* FOR LOGIC LOW *(CONTINUITY THROUGH DIODE TO GROUND).
YES
NO
REPLACE A1A1 MEMORY SUBASSY
REPLACE A1 SWITCHING UNIT (LESS A1A1 AND A1A2)
URC102-25A

Figure FO-8. Radio Set Control C-10905/ URC-99 Trouble Analysis (Sheet 3 of 3)

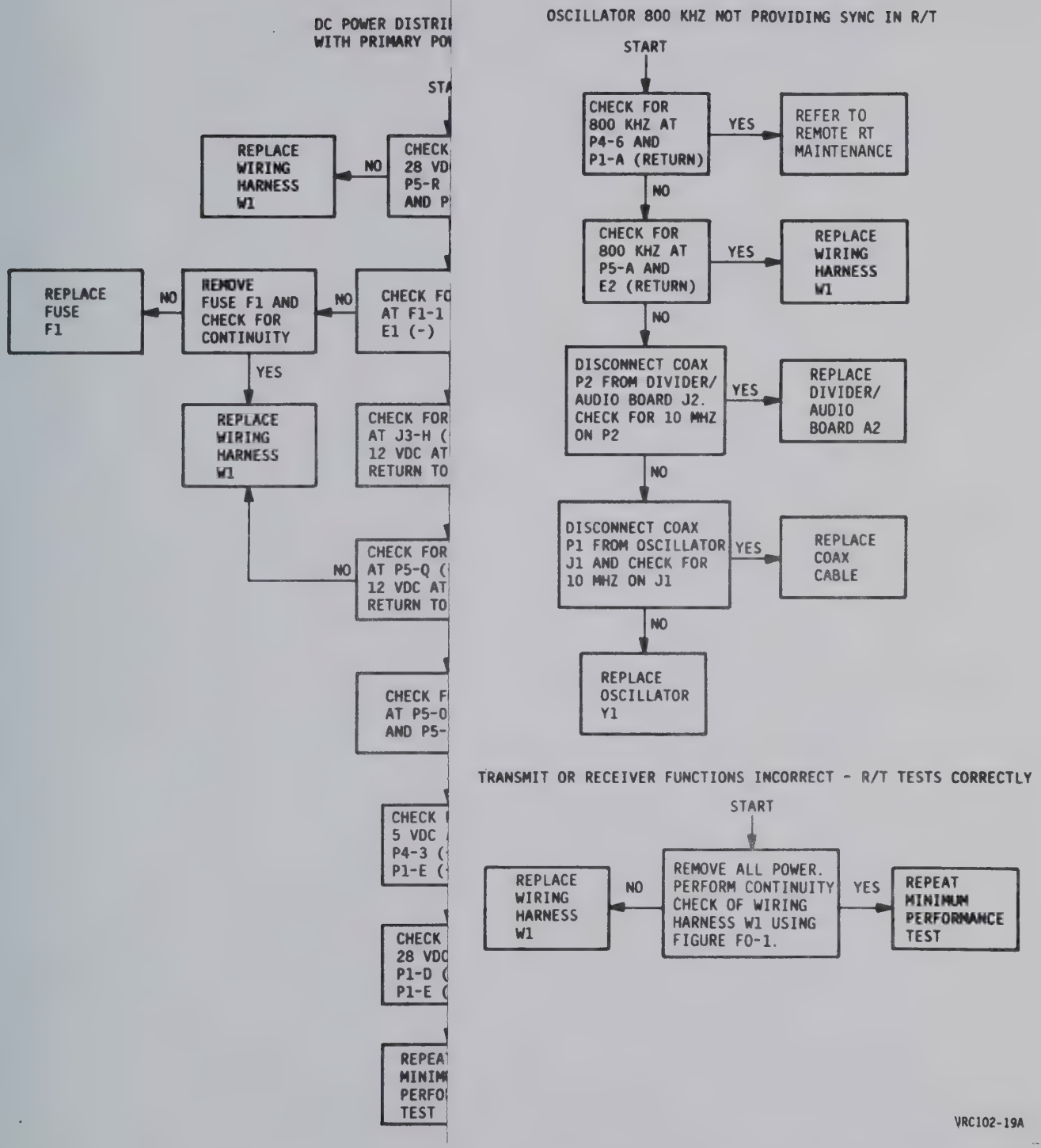
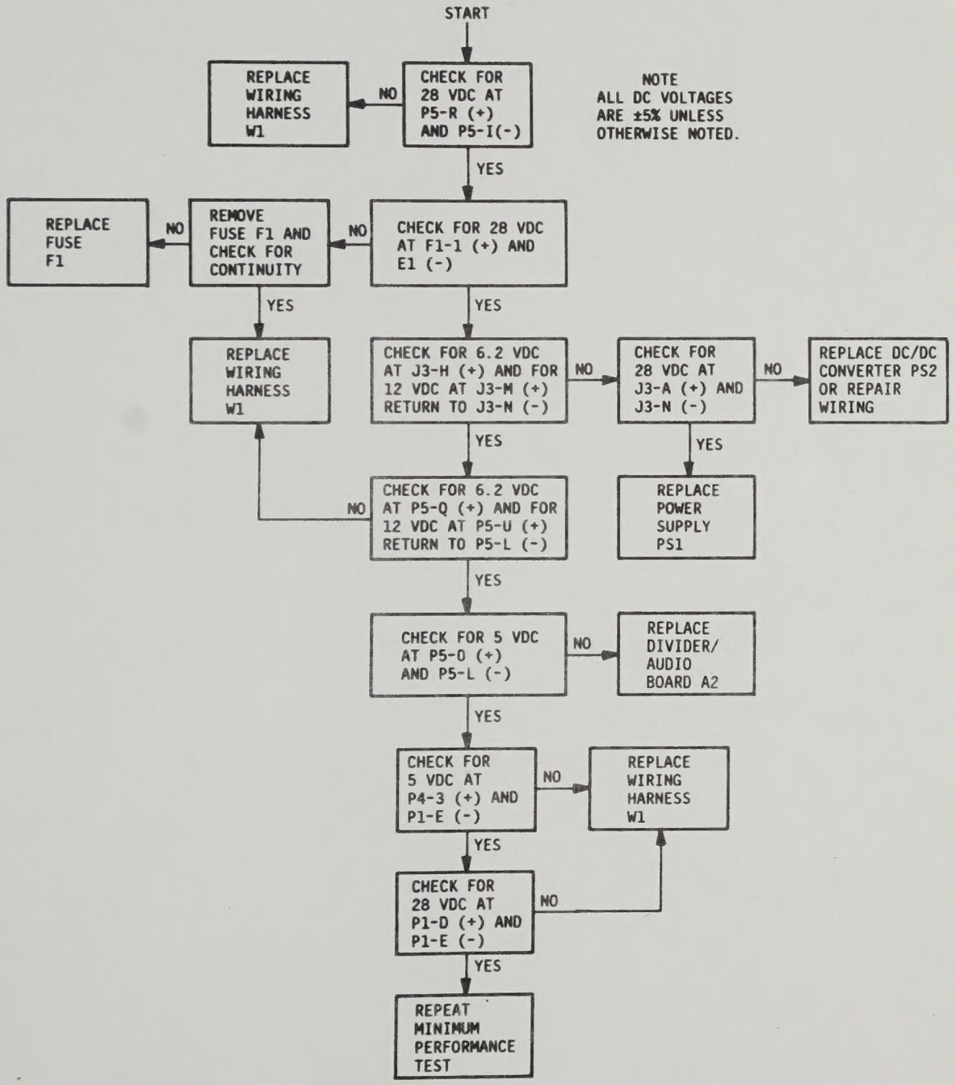

DC POWER DISTRI
WITH PRIMARY PO
STA
REPLACE WIRING HARNESS W1
NO
CHECK 28 VD P5-R AND P
REPLACE FUSE F1
NO
REMOVE FUSE F1 AND CHECK FOR CONTINUITY
NO
CHECK FO AT F1-1 E1 (-)
YES
REPLACE WIRING HARNESS W1
CHECK FOR AT J3-H (12 VDC AT RETURN TO
NO
CHECK FOR AT P5-Q (12 VDC AT RETURN TO
CHECK F AT P5-0 AND P5-
CHECK 5 VDC P4-3 (P1-E (
CHECK 28 VDC P1-D (P1-E (
REPEA MINIM PERFO TEST
OSCILLATOR 800 KHZ NOT PROVIDING SYNC IN R/T
START
CHECK FOR 800 KHZ AT P4-6 AND P1-A (RETURN)
YES
REFER TO REMOTE RT MAINTENANCE
NO
CHECK FOR 800 KHZ AT P5-A AND E2 (RETURN)
YES
REPLACE WIRING HARNESS W1
NO
DISCONNECT COAX P2 FROM DIVIDER/ AUDIO BOARD J2. CHECK FOR 10 MHZ ON P2
YES
REPLACE DIVIDER/ AUDIO BOARD A2
NO
DISCONNECT COAX P1 FROM OSCILLATOR J1 AND CHECK FOR 10 MHZ ON J1
YES
REPLACE COAX CABLE
NO
REPLACE OSCILLATOR Y1
TRANSMIT OR RECEIVER FUNCTIONS INCORRECT - R/T TESTS CORRECTLY
START
REMOVE ALL POWER. PERFORM CONTINUITY CHECK OF WIRING HARNESS W1 USING FIGURE FO-1.
NO
REPLACE WIRING HARNESS W1
YES
REPEAT MINIMUM PERFORMANCE TEST
VRC102-19A

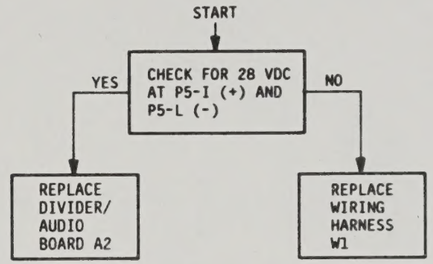
Figure FO-9. MT-6165 Mount Trouble Analysis

DC POWER DISTRIBUTION INCORRECT
WITH PRIMARY POWER APPLIED


START
CHECK FOR 28 VDC AT P5-R (+) AND P5-I(-)
NO
REPLACE WIRING HARNESS W1
YES
CHECK FOR 28 VDC AT F1-1 (+) AND E1 (-)
NO
REMOVE FUSE F1 AND CHECK FOR CONTINUITY
NO
REPLACE FUSE F1
YES
REPLACE WIRING HARNESS W1
YES
CHECK FOR 6.2 VDC AT J3-H (+) AND FOR 12 VDC AT J3-M (+) RETURN TO J3-N (-)
NO
CHECK FOR 28 VDC AT J3-A (+) AND J3-N (-)
NO
REPLACE DC/DC CONVERTER PS2 OR REPAIR WIRING
YES
REPLACE POWER SUPPLY PS1
NO
CHECK FOR 6.2 VDC AT P5-Q (+) AND FOR 12 VDC AT P5-U (+) RETURN TO P5-L (-)
YES
CHECK FOR 5 VDC AT P5-O (+) AND P5-L (-)
NO
REPLACE DIVIDER/ AUDIO BOARD A2
YES
CHECK FOR 5 VDC AT P4-3 (+) AND P1-E (-)
NO
REPLACE WIRING HARNESS W1
YES
CHECK FOR 28 VDC AT P1-D (+) AND P1-E (-)
NO
YES
REPEAT MINIMUM PERFORMANCE TEST

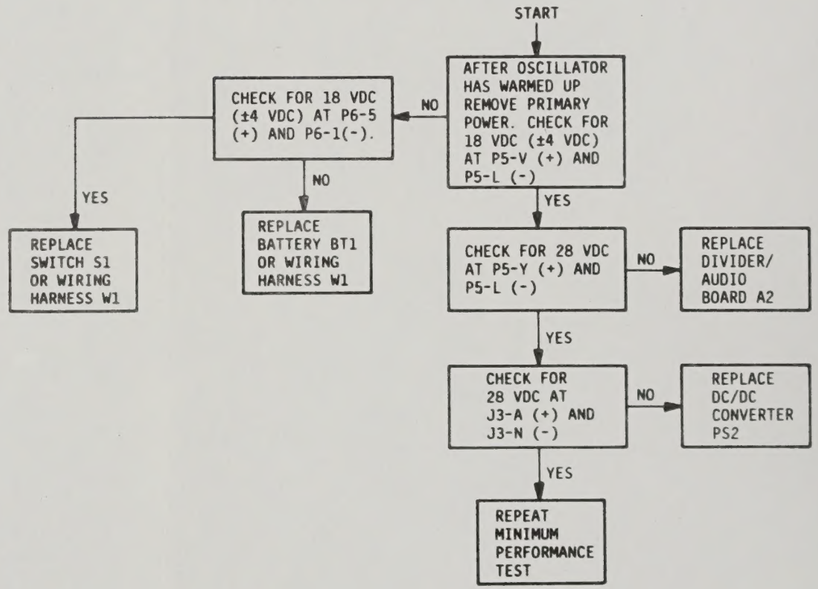
NOTE
ALL DC VOLTAGES ARE ±5% UNLESS OTHERWISE NOTED.

DC POWER DISTRIBUTION INCORRECT
WITH EXTERNAL POWER CONNECTED

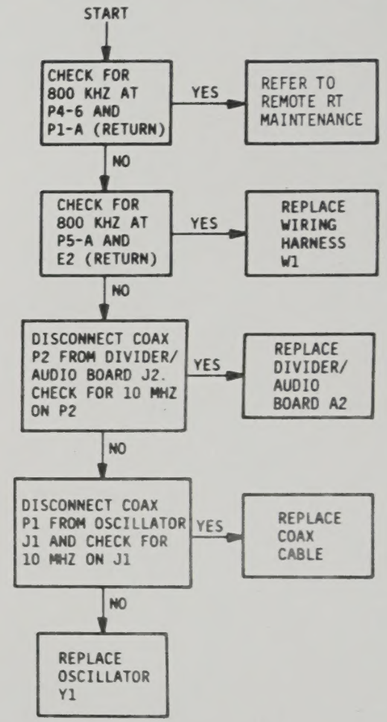


NOTE
ALL VOLTAGES ARE ±5%. UNLESS OTHERWISE NOTED.

BATTERY CIRCUIT INCORRECT
APPLY PRIMARY POWER KEEP ALIVE SWITCH S1 SET TO ON


START
AFTER OSCILLATOR HAS WARMED UP REMOVE PRIMARY POWER. CHECK FOR 18 VDC (±4 VDC) AT P5-V (+) AND P5-L (-)
CHECK FOR 18 VDC (±4 VDC) AT P6-5 (+) AND P6-1(-).
NO
YES
REPLACE SWITCH S1 OR WIRING HARNESS W1
NO
REPLACE BATTERY BT1 OR WIRING HARNESS W1
YES
CHECK FOR 28 VDC AT P5-Y (+) AND P5-L (-)
NO
REPLACE DIVIDER/ AUDIO BOARD A2
YES
CHECK FOR 28 VDC AT J3-A (+) AND J3-N (-)
NO
REPLACE DC/DC CONVERTER PS2
YES
REPEAT MINIMUM PERFORMANCE TEST

OSCILLATOR 800 KHZ NOT PROVIDING SYNC IN R/T


START
CHECK FOR 800 KHZ AT P4-6 AND P1-A (RETURN)
YES
REFER TO REMOTE RT MAINTENANCE
NO
CHECK FOR 800 KHZ AT P5-A AND E2 (RETURN)
YES
REPLACE WIRING HARNESS W1
NO
DISCONNECT COAX P2 FROM DIVIDER/ AUDIO BOARD J2. CHECK FOR 10 MHZ ON P2
YES
REPLACE DIVIDER/ AUDIO BOARD A2
NO
DISCONNECT COAX P1 FROM OSCILLATOR J1 AND CHECK FOR 10 MHZ ON J1
YES
REPLACE COAX CABLE
NO
REPLACE OSCILLATOR Y1

TRANSMIT OR RECEIVER FUNCTIONS INCORRECT - R/T TESTS CORRECTLY

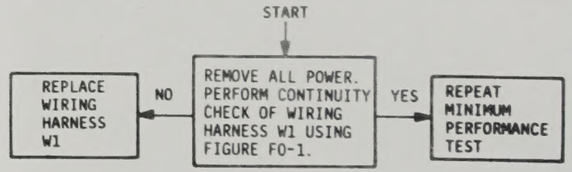

START
REMOVE ALL POWER. PERFORM CONTINUITY CHECK OF WIRING HARNESS W1 USING FIGURE FO-1.
NO
REPLACE WIRING HARNESS W1
YES
REPEAT MINIMUM PERFORMANCE TEST

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Figure FO-9. MT-6165 Mount Trouble Analysis